THE ENGINEERING AND MINING JOURNAL

VOL. XXXV. No. 1.

RICHARD P. ROTHWELL, C.E., M.E.,
ROSSITER W. RAYMOND, Ph.D.,
CHARLES KIRCHHOFF, Jr., M.E., } Editors.

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Communications for Mr. RAYMOND should be addressed to ROSSITER W. RAYMOND, P.O. Box 1465, New York. Articles written by Mr. RAYMOND will be signed thus * ; and only for articles so signed is he responsible.

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THE SCIENTIFIC PUBLISHING CO., Publishers,
P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

EDITORIALS:	PAGE.
The February Meeting of the American Institute of Mining Engineers.	1
The Tariff Bill of the Finance Committee of the Senate	1
The Genesis of Ore-Deposits	1
CORRESPONDENCE:	
The Volhard Silver Assay	2
The Genesis of Ore-Deposits	3
The Value of Foreign Coins	4
A Safe Safety-Lamp	5
The Siemens Direct Process	5
New Publications	5
Power *versus* Hand-Drilling on Lake Superior	6
The Bull Direct Process	6
The Whitwell Stove for Charcoal Furnaces	6
NOTES:	
The Pressure of Gas in the Solid Coal	4
The Chicago Copper Company	8
GENERAL MINING NEWS:	
Arizona	7
California	7
Canada	7
Colorado	7
Dakota	7
Idaho	8
Maine	8
Mexico	8
Michigan	8
Montana	8
Nevada	8
New Mexico	8
New York	8
Pennsylvania	8
Tennessee	8
Utah	8
Vermont	8
Patents Granted by the United States Patent-Office	8
FINANCIAL:	
Gold and Silver Stocks	9
Copper Stocks	10
IRON MARKET REVIEW	11
METALS	11
COAL TRADE REVIEW	12
BULLION MARKET.	12
STATISTICS OF COAL PRODUCTION	12
Advertisers' Index	x

DR. THOMAS M. DROWN, Secretary of the American Institute of Mining Engineers, announces that the annual meeting of the Institute will be held in Boston, beginning Tuesday, February 20th, 1883.

THE Finance Committee of the Senate has now completed its little tariff bill, which places an expectant country in the embarrassing position of having three sets of schedules to choose from. There are very few articles, so far as we have been able to see, in examining the metal schedule, in which the members of the Tariff Commission, of the House Ways and Means Committee, and the Finance Committee of the Senate agree. The Tariff Commission on the whole recommended a modest reduction ; the Ways and Means Committee tinkered with the schedule so devised, to the extent of increasing a few figures, often in a very injudicious manner ; the Senate Committee, on the other hand, has, in a general way, proposed a further reduction. They compare as follows :

	Present.	Ways and Means.	Senate Finance C.
Iron ore	20 per cent.	50c. per ton.	50c. per ton.
Iron pyrites	20 per cent.	50c. + 2½c. for copper.	50c. + 2½c. for copper.
Oxide manganese	20 per cent.	50c. per ton.	.....
Pig-iron	$7 per ton.	0·3c. per lb.	$6 per ton.
Cast scrap	$6 per ton.	0·3c. per lb.	$6 per ton.
Wrought scrap or scrap steel	$8 per ton.	0·3c. per lb.	$6 per ton.
Bar iron, according to dimensions	1@1·5c. per lb.	0·9@1·2c. per lb.	0·9@1·2c. per lb.
Iron railroad bars	0·7c. per lb.	0·7c. per lb.	0·7c. per lb.
Cut nails and spikes	1·5c. per lb.	1·25c. per lb.	1·25c. per lb.
Iron and steel forgings	2c. per lb.	2½c. per lb.	.....
Anvils and cable chains	2½c. per lb.	2c. per lb.	2c. per lb.
Boiler tubes	3½c. per lb.	3c. per lb.	4c. per lb.
Other wrought-iron or steel tubes	3½c. per lb.	2¼c. per lb.	2¼c. per lb.
Boiler and sheet-iron, according to gauge	1¼@1½c. per lb.	1·3@1·9c. per lb	1·25@1·8c. per lb.
Tin plates	1·1c. per lb.	2c. per lb.	1·1c. per lb.
Hoop, band and scroll	1¼@1¾c. per lb.	1·2@1·6c. per lb.	1·2@1·6c. per lb.
Steel ingots, blooms	45 per cent, and on smaller sizes valued at 7c., or less, 2¼c.; above 7, 3c.; above 11, 3¼c. per lb.	Valued at 2½c., or less, 2c. per lb.; above 2½c., 2¾c. per lb.; above 9, 3c. per lb.	Valued at 5c., or less, 1½c. per lb.; above 5c., 2c. per lb.; above 9c., 2¾c. per lb. (all crucible). All steel ingots, blooms, etc., not crucible steel, 0.6c. per lb.
Steel railroad bars	1¼c. per lb.	0.8c. per lb.	0.8c. per lb.
Iron wire	¼ in. diam. to No. 16, 2c. + 15 per cent.; No. 16 to No. 25, 3·5c. + 15 per cent; above No. 25, 4c. + 15 per cent per lb.	To No. 10, 2¼c.; No. 10 to No. 18, 2¾c.; No. 18 to No. 26, 3¼c.; above, 4c. per lb.	No. 5 to 10, 1½c.; No. 10 to 16. 2c.; No. 16 to 26, 2½c.; smaller than No. 26, 3c.
Steel wire	¼ in. diam. to No. 16, 2½c. + 20 per cent; finer, 3c. + 20 per cent.	Same as iron wire.	Same as iron wire.
Wire cloth	Not provided for.	Same as wire of same gauge + 3c. per lb.	Same as wire of same gauge + 2c. per lb.
Wire rope	Not provided for.	Same.	Same as wire of same gauge + ¼c. per lb.
Lead ore and dross	1½c. per lb.	1½c. per lb.	1½c. per lb.
Pig-lead	2c. per lb.	2c. per lb.	2c. per lb.
Manufactured lead	2¾c. per lb.	2c. per lb.	45 per cent.
Nickel	37c. per lb.	15c. per lb.	20c. per lb.
Copper ore	3c. per lb.	2½c. per lb.	2½c. per lb.
Regulus	3c. per lb.	3½c. per lb.	3½c. per lb.
Ingot	5c. per lb.	4c. per lb.	4c. per lb.
Manufactured copper	45 per cent.	35 per cent.	35 per cent.
Yellow metal	.....	3c. per lb.	.....
Antimony	.....	10 per cent.	.....
Spelter	1½c. per lb.	1½c. per lb.	1½c. per lb.
Sheet-zinc	2¼c. per lb.	2¼c. per lb.	2¼c. per lb.

The most striking changes in iron are the reduction in pig—already announced—a slight reduction in plate and sheet, a retention of the present duty on tin plates, and quite a sweeping lowering on steel. The Finance Committee singles out crucible steel, with the rates specified, and then places all other steel in crude form at 0·6 cents, with steel rails unchanged at $17.92 per ton. It attempts, too, a solution of the vexed question, "What is steel?" which in years past troubled the experts in the American Institute of Mining Engineers so much. The definition is as follows:

"Steel in any form not specially enumerated or provided for in this act, per pound, three cents. Provided that all metal produced from iron or its ores, which is cast and malleable, of whatever description or form, without regard to the percentage of carbon contained therein, whether produced by cementation, or converted, cast, or made from iron, or its ores, by the crucible, Bessemer, pneumatic, Thomas-Gilchrist, basic, Siemens-Martin, or open-hearth process, or by the equivalent of either, or by the combination of two or more of the processes, or their equivalent, or by any fusion or other process which produces from iron or its ores a metal either granular or fibrous in structure, which is cast and malleable, excepting what is known as malleable iron castings, shall be classed and denominated as steel."

The committee sweeps away the increase on larger sizes of iron and steel wire recommended by the Ways and Means Committee, and makes a strong reduction all around. It discriminates especially against wire rope.

The metal schedule proper remains in much the same position as before.

Among the recent recommendations of the House Ways and Means Committee, we notice 30 cents per ton on coal slack, 75 cents on bituminous coal, 20 per cent on coke, 30 per cent on gunpowder and explosives generally, india-rubber goods 25 per cent, and salt in bulk 6 cents per 100 pounds. The Finance Committee, however, goes back to the old figures.

THE GENESIS OF ORE-DEPOSITS.

We publish elsewhere an article on this subject by Mr. RUDOLF KECK of Denver, which deserves attention, as a suggestive attempt to generalize from known data, and also a contribution to the data themselves. Under the latter head, we should feel obliged to Mr. KECK if he would give us more in detail the experiments of Professor SANDBERGER, to which he alludes. We have not yet read the book, and know it only through the medium of the Austrian *Zeitschrift*, in which, by the way, Professor SANDBERGER'S conclusions are vigorously attacked.

We publish Mr. KECK'S paper because we like it, not because we agree with it. We are glad to have the subject of ore-deposits discussed from the stand-point of chemical geology, and we welcome intelligent contributions to such discussion, whether they represent our views or not. Moreover, the importance of closer study and description of individual mines and mining districts is very great ; and we are glad to have it emphasized. As Professor POSEPNY has forcibly urged, a good deal of this sort of work must be done, before safe generalizations will be possible. The English mathematician, DE MORGAN, cited the vast amount and meager results of meteorological observations as an instance of the failure of the inductive method. But the rapid progress in meteorological science which has followed the activity of our Signal Service Bureau proves that the former difficulty was not in the inductive method, but in the loose and heterogeneous character of the observations. The data heretofore accumulated as to ore-deposits are open to similar criticism. Thousands of descriptions of mines and mining districts have added lit-

tle to our theoretical knowledge. As Mr. KECK says, the work should be more carefully done, and the chemist and microscopist should be called to assist.

Discussion is doubtless what Mr. KECK, like all other thoughtful inquirers, most desires; and we shall pay him the compliment of indicating some points in which we consider his views defective. Their one comprehensive defect is that which affects all generalizations at the present stage of our knowledge. They are premature. Mr. KECK is quite right in attributing much to the agency of water, organic matter, etc. But we think the details of his theory, as a general theory, are not sufficiently supported by facts.

Briefly stated, the theory is, that the sulphide ores were present in the original eruptive rocks as silicates of the metals, and that they were changed into sulphides by the action of alkaline sulphides, which themselves derived their sulphur from organic matter of animal origin. The first difficulty in this hypothesis arises from the probability that all known eruptive rocks are themselves the product of the fusion of sedimentary rocks. It is therefore not safe to consider as the "primitive constituents" of an eruptive rock substances which may have entered it after fusion and before (or even after) solidification.

Again, if we are to go back to primitive rock-constituents, we can not ascribe to organic origin the vast quantities of sulphur required for the production of metallic sulphides. The organic sulphur must itself have been obtained from the inorganic world. In short, there must have been sulphur before there were sulphates and sulphides, in the mass of the earth itself. The hypothesis that the ocean itself at one period was sulphatic has much in its favor, as Professor WURTZ and others have forcibly shown, though they have not shown the compatibility of such an ocean with animal or vegetable life, and must therefore, we suppose, relegate it to a period anterior to the appearance of such life. The whole subject is still obscure; but in the present state of our knowledge, it is more reasonable to assume the formation of sulphates without the intervention of organic matter, than to suppose the metals to have been, in original combination, silicates. Moreover, the specific gravity of the earth's interior is higher than that of such silicates as we find in its crust.

The agency of organic processes in the formation of ore-deposits has been lucidly explained by Prof. STERRY HUNT, with whose chemical and geological essays Mr. KECK does not seem to be familiar. It is eminently a work of redistribution and aggregation. But we do not think it can be made the agent of sulphatization.

Nor do we agree with Mr. KECK in attempting to classify the ages of vein-formation according to their mineralogical contents. The data are not sufficient as a basis for any such law. To take his own example, we do not always or nearly always find that veins of banded structure show first quartz, then metallic sulphides, and then spars, filling the fissure. It would be easy to cite innumberable instances in which bands of spar inclose a later filling of quartz, and in which the metallic ores are contemporaneous, to all appearance, with the quartz. In fact, this is one of the very points which should not be confused by generalization, but carefully studied, free from all such predisposition, in each individual instance.

We differ again with Mr. KECK as to the invariable character of the process of ore-deposition. Perhaps we do not quite understand what he means when he says that the circumstances were manifold, but the process in itself was always the same. Perhaps he is thinking more particularly of certain kinds of ore-deposits. At all events, the statement, if it means any thing, is scarcely applicable to such various deposits as are actually known to the miner.

Some light is perhaps thrown on it by Mr. KECK'S proposed classification of ore-deposits. He objects to distinguishing them according to their form or their contents, and proposes instead a classification based on a single feature in their history. Three classes, he says, cover all that he can conceive—fissure-veins, veins of replacement, and secondary deposits. This shows how much easier it is to criticise than to construct. The systems which Mr. KECK condemns are at least good for something. It is convenient, if not scientific, to talk about gold, silver, copper, or lead deposits; it is convenient to speak of veins, beds, and masses; and we undertake to say that Mr. KECK never does and never could describe an ore-deposit without including these features. But the system he proposes as a substitute is scarcely good for any thing. Nearly all veins of replacement are enlargements of original fissure-veins; the majority of fissure-veins have been enlarged by processes of replacement; and the term secondary deposits, though a handy one for loose, popular description, can scarcely receive a scientific definition which would not include fissure-veins and veins of replacement. Yet, indefinite as these classes are, it would be difficult to bring under either of them such deposits as the Ducktown copper mines, the iron mines of New Jersey, Lake Champlain, or Lake Superior, the Mansfield copper-schists, and many others. Mr. KECK'S own illustrations condemn his system. He puts the Leadville mines under "veins of replacement," but the lead ore-deposits of the Upper Mississippi and of Raibl in the Austrian Alps under "secondary deposits," to which class also he refers the quicksilver mines of California!

We heartily agree with him in condemning "the absurd worship of fissure-veins." But it is useless to deny that fissure-veins afford, in their greater regularity of form, a certain guaranty of permanence which is wanting in some other kinds of deposits.

Mr. KECK apparently subscribes to the belief that the contents of fissures are derived from the country-rock inclosing them. This is true enough, in a sense; but it need not be true that the metalliferous contents of a fissure came from the wall-rock at precisely the horizon where they are now found. The general term "from below" includes also the deeper-lying country-rock through which a fissure may pass. We are not ready yet to admit that the lead, silver, and iron ores of Leadville came from the limestone which underlies them or the porphyry that overlies them. And the proof offered of minute traces of these metals found by analyses in the rock is not sufficient to cover the case. *

CORRESPONDENCE.

[Communications will be noticed only when accompanied with the full name and address of the writer. Unless specially desired, only initials will be printed. We invite criticism and comment by the readers of the ENGINEERING AND MINING JOURNAL. Replies not intended for publication should be addressed to the Editor of the ENGINEERING AND MINING JOURNAL in blank, stamped, and sealed envelopes.]

The Volhard Silver Assay.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The Volhard silver assay process having been recommended to me by a gentleman of acknowledged ability in metallurgical matters, as an exceedingly accurate method, and one now coming into use among assayers in Europe, I have had a series of tests made by one of my most careful assistants in the "silver room," under my personal observation, with the results set forth in the following report, which I send you as being of general interest.

If any of your readers have used the process with satisfactory results, and can furnish any suggestions regarding manipulation, etc., which would increase its efficiency, such suggestions will be cordially received.

Yours truly, HERBERT G. TORREY,
U. S. Assayer.

UNITED STATES ASSAY OFFICE,
NEW YORK, Jan. 3, 1883.

MR. HERBERT G. TORREY, U. S. ASSAYER:

DEAR SIR: In accordance with your request, careful tests have been made of the "rhodan-ammonia" process for assay of silver bullion, and I submit herewith a brief report of the results of the experiments, with remarks as to its applicability to the operations of this office.

The process depends upon the strong affinity between thiocyanic acid and silver, and the intense color formed by its combination with iron. Sulphocyanate of ammonia is added to the silver solution in presence of a ferric salt, and when all the silver present is satisfied, the thiocyanic acid combines with the iron, producing a color which varies from light brown to deep red, according to the quantity of sulphocyanate added.

In the first tests, the solution of rhodan-ammonia was made of such a strength that 100 c.c. precipitated a little less than 1000 milligrams of silver. From a solution of one tenth strength, small amounts were added until a permanent color appeared. In this way, several sets of ten or twelve assays each were worked, and the results compared with those obtained by our usual salt method.

To secure more rapid and satisfactory returns, the solution was changed so that 100 c.c. completely precipitated 1000 milligrams of silver, and left a slight excess of the precipitant, producing a red color of intensity varying in proportion to the excess of the sulphocyanate, and the assay was then worked to the point of neutralization by the addition of a decimal solution of silver, until the color disappeared. On comparing with chloride assays, this was found to give somewhat better returns than the first method, in some instances agreeing closely with the correct fineness, but in others differing too largely to be at all satisfactory.

Comparison with the chloride method was then abandoned, and sets of proof silver were weighed with scrupulous exactness, and special attention paid to the boiling of the assays, to expel all the lower oxides of nitrogen formed during the solution of the silver. To determine both the delicacy and accuracy of the process, these were worked after the first charge, with a solution diluted so that 10 c.c. contained one milligram of silver, and a correspondingly dilute solution of rhodan-ammonia. This was continued until the repeated discrepancies between the results showed that the process, as applied in these experiments, was not reliable closer than one half thousandth.

Assays of proof silver made by the salt method will indicate differences of one quarter thousandth with great distinctness and reliability, and in our regular work we frequently note differences of less than one quarter thousandth, which we call tenths, so that even on fine metal, the process failed to show any superiority over the salt.

When ten per cent or more of copper is present in the bullion, the color of the solution interferes with the noting of the appearance or disappearance of the iron reaction, while in the salt method copper is not an impediment.

Other points observed during the experiments may be briefly mentioned as follows:

It requires less agitation than the chloride process; but I think that it would nevertheless take fully as much time to work a set, as with salt, and there is the additional operation of adding the ferric indicator.

It requires prolonged boiling, the experiments tending to show that the presence of the fumes of nitric peroxide render the assay worthless, although the investigation was not followed up in this direction.

In conclusion, I would respectfully submit that the experiments here reported upon conclusively show that the rhodan-ammonia process, so far as known and applied by us, is decidedly inferior to our present chloride method. Yours respectfully, GEORGE R. COMINGS.

UNITED STATES ASSAY OFFICE, Jan. 3, 1883.

THE GENESIS OF ORE-DEPOSITS.

Written for the Engineering and Mining Journal by Rudolf Keck, Denver, Colo.

The aim of the study of ore-deposits is to acquire a clear understanding of their genesis, which will enable the miner to conduct both prospecting and mining in a rational manner. But in no branch of geology are we so far from a clear understanding as in this. The reason is that, as a positive science, it requires the working together of the chemist, the mineralogist with his microscope, and the mining engineer. But the latter professes to have no time for reading geological periodicals, or for giving careful descriptions of the particular phenomena of his mine or mining district, with correct maps, or an abstract of the more important practical conclusions at which he has arrived; while we can not always expect that the chemist and mineralogist have acquired practical experience in regard to the different conditions of ore-deposits as they appear before our eyes. Hence, we should not wonder that we find the literature in this branch so limited in amount, and still more in scope.

In the three books written on ore-deposits, and published during the last thirty years, by Cotta, Grimm, and Groddeck, we fail to find what we are looking for—characteristic distinctions among the ore-deposits, instead of differences determined by their mere shape, or by the kind of metals they bear. The ghost of the formerly almighty plutonic school is still hovering between the lines of these books; fissures are opened, closed, and reopened like the stops on a clarionet; dikes of the same rock content themselves by catching cold; at another locality, but under the same circumstances, they do not, just as may be required for a plausible explanation; parts of the vein-matter emigrate into the wall-rock, and suggestions of ore sublimation or igneous injection are gravely made. If we find such crude doctrines in these books, otherwise very good, what can we expect from periodicals, and the ordinary little text-books on geology? Look at their pictures, representing veins like mathematically correct parallelopipeds! Nothing is said about the fact that they are mostly small and irregular in length and composition, while the wood-cut hints that they go down to the center of the earth. The innocent student can not help but see our earth's crust full of bonanzas, and impatiently waits for the time when he can go prospecting.

Thirty years ago, chemists (especially G. Bischof, of Bonn) made revelations previously unanticipated in geology; and more recently, the microscope has led to a complete revolution in petrography. Thirty years ago, Bischof had proved that the materials of the gangue in veins originated in their wall-rocks. But a few years ago, Prof. F. Sandberger, at the University at Würzburg, Bavaria, himself a practical mining engineer, arrived at the conclusion, and followed it out, that substances which occur together in such close connection as vein-material and ores must logically have a similar origin. He separated the constituent silicates of rock (for instance, mica), and analyzed them in much larger quantities than those generally used for analysis. The results were and still are quite astonishing. With the exception of tellurium, gold, and mercury, for which he could not get proper material for analysis, all the chemical elements occurring in ore-veins have been detected *in those silicates*, undoubtedly demonstrating that not only the ingredients of the gangue, but also those of the ores, are contained in the eruptive rocks which often are the wall-rocks of veins, or occur in their vicinity. A further result of his laborious researches is the proof that these metallic contents are found in the silicates of crystalline rocks of *all* geological periods.

We find ourselves forced to believe in a causal connection between eruptive rocks and ore-deposits, when, in the light of Professor Sandberger's researches, we study the aspect of volcanic rocks and the transmutations they undergo subsequently to their first consolidation, by weathering, by exhalations of sulphureted hydrogen, muriatic acid, and other gaseous emanations, by which they are converted from a hard to a soft clayey state, or are bleached and become porous, fissile, or honeycombed, until at length they crumble into a siliceous powder; when we observe the massive segregations of ores in eruptive rocks; when we take into consideration that those mountainous regions in which eruptive rocks are wanting contain the least ore-deposits, and that the ore-deposits occur more frequently in older than in the recent rocks, and are more common at the junction of various kinds of rocks than in the midst of large districts of a uniform rock; and that they usually occur in the latter case, only in case the rock is metamorphosed.

The entire material of all sedimentary rocks has been derived from the destruction and decomposition of former ores; thus it can be traced back to that region in our earth's crust from which the eruptive rocks were and are still arising.

The Archæan rocks are, among those of all sedimentary periods, the richest in ores, not only because they show the mightiest development, but also because they have been longest exposed to volcanic and chemical activity. "They are the *only universal* formation, they extend over the whole globe, and were the floor of the ocean and the material of all emerged land, when life first began to exist." In these rocks we have to acknowledge the visible origin of certain ores which we find, nowadays, *as secondary products in higher geological horizons.*

The fact that all minerals occurring in ore-deposits could have originated in aqueous solutions; the drusy or combed texture of some ore-deposits; the occurrence of minerals together with fragments of the wall-rocks in veins, a part of which appears to have been disintegrated by the action of water and friction; the omnipresence of water above and in our earth, especially during former geological periods; the absence of all indications of former *intense* heat within the ore-deposits; the pseudomorphoses and other mineralogical phenomena; all these circumstances indicate that water was and still is the main agent in the mineralizing process.

All subterranean movements that produce joints and fractures in rocks, and the chemical action of the water circulating in our earth's crust, have given origin and peculiarities to ore-deposits. In many cases, it is evident that the origin of an ore-deposit commenced with a more or less empty fissure caused by subterranean movements; but in many other cases, this can not be shown. The occurrence in granite of numerous crystals of tourmaline more than six inches long, but fractured and cemented together again in their finest fractures by granitic matrix; the occurrence of fractured crystals of orthoclase in granite; limestone containing manifold minerals at its contact with granite; all this demonstrates that an afflux of silicates in solution has taken place after the crystallization of other silicates within the granitic mass. Remember also that the microscope has proved that within eruptive rocks transmutations and new compositions of minerals have taken place, by means of which the primitive state of those rocks is essentially changed. We see such changes taking place. We see mountains of formerly eruptive rocks altered to serpentine, chloritic and talcose shists, diabase and other rocks, as secondary products by mere chemical action. We find dolomites decreasing in their quantity of lime, by which procedure they decrease in their volume. We observe that anhydrite, by the mere admission of one fourth of its weight of water, has been transformed to gypsum, while the increase of its volume has been so great and powerful that mighty sediments have been upheaved, distorted, bent, or folded. Should we not, then, be induced by such facts to believe that the origin of veins has not been in every case in the opening of fissures by rough volcanic power or other subterranean movements, but that the veins have attained their present dimensions by the gradual solution, removal, and replacement of the rocks? In many cases, we may even suppose that the faults in a rock or the fractures within veins were caused by the preceding chemical and physical internal changes.

Change of the Silicates of Metals Contained in the Eruptive Rocks into Sulphides.—The meteoric water on the surface of our earth carries free oxygen, nitrogen, and carbonic acid. Penetrating the upper parts of the earth, which are rich in decaying organic matter, the free oxygen produces carbonic acid, which is absorbed by the water; but this on its way downward takes up still more carbonic acid, which rises from the interior, and carries down also some organic substances which reduce the sulphates of metals to sulphides. In this way, the water effects the decomposition of a great many minerals by solution and precipitation. The results are carbonates, sulphates, sulphides, and silicic acid (becoming quartz afterward), while the less soluble part mostly remains as silicates of alumina (clay) and magnesia (talc).

The microscope has revealed the existence in abundance of minute cavities in eruptive rocks, in which water and salt, compressed carbonic acid, and sulphates are inclosed so hermetically that the water does not escape even when strongly heated. These substances are *primitive constituents* of such rocks as well as the silicates. Therefore, it is probable that there were more of these substances present during the eruptions of the rock, especially also sulphureted hydrogen, as we observe them during volcanic eruptions nowadays. The same gas is produced by means of organic matter reducing the sulphates of alkalies to sulphides, which change the salts of metals to sulphides. And in what state do we find the metals of our own ores generally? In that of sulphides.

Organic matter still occurs in many veins; for instance, in the state of asphaltum in the cinnabar mines in the Bavarian Palatinate; in that of petroleum in mines in California, Nevada, and Hungary; in that of anthracite and graphite in mines in Transylvania, Portugal, Derbyshire, Calcutta, Saxony, Baden, etc.; and plentifully in the petrified organic bodies of sedimentary rocks, and as coloring ingredient of fluorspar, amethyst, and smoky quartz in many mines.

It is an evident fact that in many mines the quantity and richness of the ores depend on the occurrence of organic matter, which is only the remains of larger quantities of it, present in a state of decay in former times. To this day, sulphureted hydrogen is very common among the gas exhalations found on and in our earth, and is easily absorbed by the circulating waters therein. But if that organic matter did not contain more or less sulphur, it could not therefore produce much sulphureted hydrogen; and hence, in regard to *ore-building*, those sediments were more favorable which contained the remains of *animal* bodies; for instance, the upper bed of the blue limestone at Leadville; while we find no unusual concentration of metallic matter in the great beds of bituminous shale in the Paleozoic rocks, the carbonaceous matter of which has been derived from the remains of sea-weeds.

The more the leaching process we have described advanced, the more were the bicarbonates changed into monocarbonates, and the more were the dissolved salts of lime, baryta, etc., enabled to crystallize out of their solution. Thus, we find as ultimate result of that process those different minerals constituting the "gangue;" for instance, the various carbon spars, the heavy-spar, and fluorspar. And thus we find just those veins to be the latest in origin, in which these spars predominate; they cross the other veins in which quartz and ores predominate. Therefore, we may suppose that many dissimilar so-called vein-formations are in the main but formations of different leaching periods. In veins with banded or combed structure, we almost always observe that quartz has opened the period of deposition; the veins of the "noble quartz formation" are indeed the oldest *among the vein-formations.* Then followed a period of segregated metallic sulphides, and the different spars terminated the more or less close filling of the fissure. Then began the period of secondary mineral products, which is still going on before our eyes. Meanwhile, rocks which had covered the top of such vein-regions were carried off by erosion, in consequence of which the meteoric waters containing air got access to the vein and began their oxidizing and chloridizing work on the minerals. Thus we often find in the upper parts of veins a zone of oxidized metals and their compounds with acids, constituting the "gossans," the "iron hat," the "pacos," etc. In many cases, this zone is a zone of enrichment; for instance, in the ore-deposits of Chili, of Leadville, of the gold-bearing veins of Colorado, etc.

Many of these upper zones and their wall-rocks may have reached farther up in former times; but they were also carried off by erosion, the products of which we find in veins, although they are rare. For instance, in Pennsylvania there is a vein between walls of propylite, which itself contains breccia of quartz porphyry, mica slate, and various kinds of sandstone. In Bolivia, there occurs a vein in porphyry, which contains breccia of argillaceous slate. In a vein at Schemnitz, Hungary, quartz pebbles occur extending to the depth of 930 feet. Fossils and other foreign bodies have also been found in mineral veins. But the most interesting occurrence of this kind is that of literally conglomerate veins in Colorado and Utah. There, the spaces between the round pebbles and boulders were filled with a mineral solution cementing the pebbles and boulders together into a conglomerate ore. In the Bassick mine, near Silver Cliff, Colorado, the pebbles consist of various kinds of eruptive rock, mingled with which are masses of silicified wood and charcoal; the

ore consists of rich tellurides of gold and silver, free gold, and the argentiferous sulphides of lead, zinc, copper, and iron. In the Bull-Domingo, near Silver Cliff, Colorado, and in the Carbonate mine at Frisco, Utah, the cementing matter is argentiferous galena.

How were the precipitated metallic sulphides segregated and consolidated in depth? The books say only that the fissures have been filled by mineral springs; but they do not tell how. There are many mineral springs carrying free carbonic acid, sulphates, sulphureted hydrogen, or organic matter, arising from the selvages of ore-veins, using the latter like other fissures as their shortest way to the surface of our earth. Hence, the conclusion was drawn that a causal connection may exist between these springs and the minerals in the vein. But Professor Sandberger had, several times, opportunities to pump out such springs, and to examine the fissures through which the springs were ascending: he never found a single trace of a sediment on the walls, although they cause large sediments of minerals on the surface, where the air has access.

Those who are acquainted with the rules of ore concentration know how slowly a current of water will carry off fine grains of minerals, no matter how high their specific gravity may be. The segregation of the fine particles in such precipitates would take place only in *stagnating* water containing a larger amount of organic matter than those springs contain. Those springs have never caused the formation of a mineral vein; they have only carried off from them. But they cause precipitation and fixation of the precipitated sulphides by *filtering* through a material offering *a great surface*. An instructive example of this was given by a mineral spring in the vicinity of Fulda, Germany; its upper part had caved in, and the water was then flowing between the pebbles of the alluvium, coating them with pyrites as nicely as the galvanic process does.

The miner has not very often to do with regular fissure-veins; he rather has to take out his ores from more or less decomposed zones of rock containing ore-segregations or crossed by numerous little fractures filled with ores. Even in fissure-veins the fragments of wall-rock, fine or coarse, are mostly still the main material; through this the mineral solution has had to filter either from above or from below. And in this material the solutions had easier play, because the loose rock-fragments in the fissure facilitated the chemical action. Especially if the vein-region was located very deep below the former surface, perhaps under a former sea, the meteoric waters could not penetrate directly from above, but must come indirectly from below by hydrostatic pressure; or the sea itself had access to fissures. We need only remember that in the sea-water, by analyzing the residues in the boilers of transatlantic steamers, nearly half of all our chemical elements have been found (among them, for example, silver); and that chemical compounds are more easily dissolved under pressure and in a higher temperature, and that the temperature in our earth's crust increases one degree Centigrade for every thirty-three meters of depth. But wherever the speed of the mineral solutions was not stopped by impediments—for instance, by the fragments of rocks in the fissures—the sulphides, precipitated in the cooler upper regions, could not be deposited, and hence were lost for mining. The higher the springs had to ascend, the greater was the decrease of pressure and temperature; and as the different sulphides of metals are precipitated from a solution of sulphides of alkalies at different pressures and temperatures, this may, in some cases, explain why in one and the same vein the kinds of metals deposited vary with the depth. As even the deepest mines have not yet reached a depth of four thousand feet, we can not have a great many striking examples for the change of metals with the depth.

Thus we observe, that the circumstances under which ore-deposits came into existence were manifold, for physical and chemical reasons; but that the process of ore-deposition in itself always was the same.

If a fissure strikes through different kinds of rock, it may contain their different leaching products. The same may be the case where fissures cross each other. In such instances, a remarkable change in regard to the quality and quantity of ore may often be observed, and mostly a favorable change, because not only greater quantities, but also different characters, of solutions met at such points; therefore, the chances for a denser precipitation and segregation were greater.

It is well known that the same vein within the same wall-rocks may show a very different distribution of ores. This may be explained partly by the configuration of the foot-wall, forming synclinals and anticlinals (the former having a favorable, the latter an unfavorable influence on the deposition of ore); partly by other irregularities in the fissure and on the wall-rocks; partly by dikes crossing the veins and checking the speed of the solutions; and partly by the different and more or less numerous affluxes from the wall-rocks to the fissure. In this respect, I mention "ore-chimneys" and "ore-pockets."

We find the wall-rocks either fractured, or decomposed, changed in color, bleached, or silicified. Such zones are identical with those from which the leaching products were conveyed into the vein. The solutions could flow through comparatively unhindered until the porosity of the rock was diminished by the increase of decomposition to kaolin or other clayey masses. Then they could pass along main ways only—for instance, on the jointing planes of the rocks, where they sometimes formed a zone of ore-impregnation, such as leads the miner to conclude that a vein is near.

Very important for miners and prospectors is an examination of th facilities offered the meteoric waters to penetrate and permeate the rocks. In fissured or fractured rocks, the leaching process was facilitated, as more surface was offered, and the solutions were enabled easily and plentifully to descend to a region of accumulation. A similar effect was caused, if the outcrop of a vein was so situated that the surface waters could freely and plentifully enter. Steep mountain slopes, for instance, will never be so favorable as gentle ones. And if the jointing planes of a sedimentary rock dip toward a vein, this condition must have been better for its development than if they had dipped in a divergent direction. I am sorry to say that our prospectors hardly study such indications.

As we have to take it for granted that the metals contained in veins were principally contained as silicates in the eruptive rocks; as the chemical and physical process of ore-deposition always was the same; and as the water penetrates all kinds of fractures and cavities, it will always be a useless attempt to establish classes of ore-deposits on the basis of the kind of their metals and minerals, or on the basis of the form of the deposits. I can not see any other essential distinction between the ore-deposits than in the manner of their origin, either in consequence of fissures caused by subterranean movements, or *without* fissures, merely by solution, removal, and replacement of the material of their wall-rocks. Thus we may divide the ore-deposits into three main classes: 1. Fissure-veins; 2. Veins of replacement; and 3. Secondary deposits, having been derived from former deposits or segregations. The latter distinguish themselves from the other two classes by not showing periodical segregations of quartz, ores, and spars. To these belong, for instance, the ore-beds deposited in the sedimentary formation; also the lead ore-deposits of the Upper Mississippi, and at Raibl in the Austrian Alps; and the quicksilver deposits in California.

Statistics show that the greater part of the mining in the world is done in the deposits belonging to the last two classes, *not in fissure-veins*. It is strange to find in this country so much prejudice in favor of the fissure-veins. I mention only some of the most famous veins of replacement: those at Leadville, and at Christiania in Norway; the celebrated Veta Madre, near Guanajuato, in Mexico (490 feet thick, with ore-pockets of from 100 to 130 feet thickness).

The time will come when our successors will be enabled by the sum of certain coincidences of geological conditions to predict the presence of certain ore-deposits. It will arrive so much the earlier, the more our mining engineers take pains to elaborate and publish monographs on mines and mining districts and accompany them with correct maps and with statements furnished by competent analytical chemists and microscopists. The U. S. Geological Survey, although only two years old, has already accomplished excellent work—in scientific treatment equal to the work of the geological surveys of the European states, but in regard to practical application superior to them. The published abstract of the report to be issued next year, upon the geology and mining industry of Leadville, Colo., by S. F. Emmons, Geologist in charge of Rocky Mountain Division, U. S. Geological Survey, is a striking example. This treatise will be most highly appreciated by those who are acquainted with the extremely complicated nature of the geology of the region examined.

The purpose of the foregoing essay is to guide mining operators to independent observations; to instruct them how to judge of the reports prepared by mining experts; to induce mining engineers to prepare thorough monographs on their mines; and also to check the absurd worship of fissure-veins.

THE VALUE OF FOREIGN COINS.

Mr. Horatio C. Burchard, Director of the Mint, has issued the following estimate of the values of foreign standard coins:

COUNTRY.	Monetary unit.	Standard.	Value in U. S. money.	Standard coin.
Argentine Rep.	Peso	G. and S.	.90·5	1-20, 1-10, 1-5, ½, and 1 peso, ½
Austria	Florin	S.	.40·1	[argentine and argentine.
Belgium	Franc	G. and S.	.19·3	5, 10, and 20 francs.
Bolivia	Boliviano	S.	.81·2	Boliviano.
Brazil	Milreis of 1000 reis	G.	.54·6	
Brit. Pos. in N. A.	Dollar	G.	1.00·0	
Chili	Peso	G. and S.	.91·2	Condor, doubloon, and escudo.
Cuba	Peso	G. and S.	.93·2	1-16, ⅛, ¼, ½, and 1 doubloon.
Denmark	Crown	G.	.26·8	10 crowns and 20 crowns.
Ecuador	Peso	S.	.81·2	Peso.
Egypt	Piaster	G.	.04·9	5, 10, 25, 50, and 100 piasters.
France	Franc	G. and S.	.19·3	5, 10, and 20 francs.
Great Britain	Pound sterling	G.	4.86·6½	½ sovereign and sovereign.
Greece	Drachma	G. and S.	.19·3	5, 10, 20, 50, and 100 drachmas.
German Empire	Mark	G.	.23·8	5, 10, and 20 marks.
Hayti	Gourde	G. and S.	.96·5	1, 2, 5, and 10 gourdes.
India	Rupee of 16 annas	S.	.38·6	
Italy	Lira	G. and S.	.19·3	5, 10, 20, 50, and 100 lire.
Japan	Yen	S.	.87·6	1, 2, 5, 10, and 20 yen, gold, and
Liberia	Dollar	G.	1.00·0	[silver yen.
Mexico	Dollar	S.	.88·2	Peso or dollar, 5, 10, 25, and 50
Netherlands	Florin	G. and S.	.40·2	[centavo.
Norway	Crown	G.	.26·8	10 and 20 crowns.
Peru	Sol	S.	.81·2	Sol.
Portugal	Milreis of 1000 reis	G.	1.08.0	2, 5, and 10 milreis.
Russia	Ruble of 100 copecks	S.	.65.0	¼, ½, and 1 ruble.
Spain	Peseta of 100 centimes	G. and S.	.19·3	5, 10, 20, 50, and 100 pesetas.
Sweden	Crown	G.	.26·8	10 and 20 crowns.
Switzerland	Franc	G. and S.	.19·3	5, 10, and 20 francs.
Tripoli	Mahbub of 20 piasters	S.	.73·3	[ters.
Turkey	Piaster	G.	.04·4	25, 50, 100, 250, and 500 pias-
U. S. of Colombia	Peso	S.	.81·2	Peso.
Venezuela	Bolivar	G. and S.	.19·3	5, 10, 20, 50, and 100 bolivar.

THE PRESSURE OF GAS IN THE SOLID COAL.—M. E. Mallard, referring to Mr. Lindsay Wood's experiments showing the pressure of gas in the solid coal, says that the theory put forward by Mr. Wood, that the maximum pressure of the gas varies as the square root of the depth of the hole, he considers approximative only, and goes into an elaborate calculation to show that it would require to be somewhat modified. These formulas are carried out and the results placed alongside the actual pressures observed, to which they very closely assimilate. He considers that the experiments show that the coal must have been formed and covered before, and even long before the formation of the gas, since the overlying strata must at the time have had sufficient thickness and strength to resist its pressure. Where the seam of coal is exposed to the air at its outcrop, the fire-damp expands at first rapidly, and lastly almost inappreciably into the atmosphere; but the seam may be divided into distinct and separate divisions by faults, in some of which gas may be found, while closely adjacent divisions contain none. The pressure of gas may also vary on account of variations in the permeability of the coal in different places. In conclusion, he considers the experiments fully explain the mode in which the sudden outbursts of gas occur in Belgium, and finishes by saying that the most useful thing to do now is, to determine by experiments the quantity of gas exuded from the coal, and the relative permeability of the coal in a number of mines; that is, the volume of gas given off per unit of surface at the face at any time, and the coefficient of permeability of the coal with respect to the gas.

A SAFE SAFETY-LAMP.

M. Marsaut, member of the Société de l' Industrie Minérale de Saint Etienne, has been experimenting with various so-called safety-lamps, especially the Mueseler, with a view to ascertain why it is that they do not afford an absolute guarantee of safety. He found that, in a state of repose in an explosive mixture of air and gas, the explosion which takes place under the diaphragm of the Mueseler lamp and which generally extinguishes it, passes through the diaphragm on an average fifteen times in a hundred, and communicates the explosion to the exterior almost once in every hundred times. The number of times that the flame passes through the diaphragm is nearly fifty per cent of this number in a certain series of tests, and explosions occur on the outside in five per cent of the cases. This discovery easily accounts for many accidents, the causes of which have until now remained a mystery. As the results of these investigations, M. Marsaut has constructed a modified type of lamp in which no less than 5500 explosions have taken place without their being communicated to the outside, and under conditions in which the other lamps, including the Mueseler, failed to stand the test. The special feature of this new lamp is a metal shield formed by a hollow cylinder of sheet-iron, closed at the top by wire gauze, which completely surrounds the ordinary gauze of the lamp. At the lower portion of the shield is a series of apertures which permit the air necessary for supporting combustion to enter the lamp. This air, in order to reach the flame, must follow a tortuous course, and thus the danger caused by oblique, downward, and rapid currents is completely neutralized. The horizontal diaphragm, which is one of the characteristics of the Mueseler lamp, is suppressed, and is replaced by a simple washer for supporting the chimney. A wire gauze with 929 meshes to the square inch completely envelopes the chimney of the Marsaut lamp, and takes the place of the diaphragm in the Mueseler.

THE SIEMENS DIRECT PROCESS.

Mr. James Davis, mill manager of the New Steel-Works, Landore, Wales, writes as follows to the *Engineer:* In this letter I desire to embody the result of a long practical experience of the working of Siemens's direct process, by making wrought-iron directly from the ore, and of making metallic iron for the Spongy Iron and Purifying Company, at Landore and Towcester respectively.

The ore to be smelted is broken up into fragments not exceeding the size of peas or beans; to it is added lime or other fluxing material, in such a proportion that the gangue contained in the ore and flux combines with only a little oxide of iron into fluid slag. A charge, say 20 cwt. of ore, 12 cwt. of roll or hammer-scale, together with 6 cwt. of soft free coal well mixed together, is charged into the furnace when fully heated. The coal is charged with the ore; during the first hour, very little gas is required; but after this, the rotative velocity is increased, together with the heat, for a short time. At this stage, a rapid reaction is the result; the peroxide of iron, being reduced to magnetic oxide, begins to fuse, and at the same time metallic iron is precipitated by each piece of carbon while the fluxing materials form a fluid slag with the siliceous gangue of the ore. The slow rotative action is again resorted to, whereby the mass of iron is turned over and over, presenting continually new surfaces to the heated lining and to the flame within the rotator. As soon as the metal is gathered together a little, the slag is tapped, which brings with it sulphur and phosphorus. The velocity at this point is increased to one revolution in five minutes, so as to gather up the loose masses of iron into five or six metallic balls. These are taken and shingled with a steam-hammer or squeezers into a bloom, which, when reheated, will roll into a bar similar to an ordinary puddled one. I may say that the balls must be worked as quickly as possible, and then the product will stand as much work as common puddled iron.

With reference to the amount of coal used in the producers, the abstract report shows that I have succeeded in making what Dr. Siemens said could be done in his paper before the Mechanical Engineers in 1873, that is, one ton of iron made to one ton of producer coal used. With the direct process, I would suggest that Siemens's open-hearth furnaces are worked in connection with this process, as all the small ore can be utilized and the blooms can be used also to a great advantage and profit. As regards the statement made by Mr. G. W. Maynard, that the blooms are only fit for the open-hearth furnace, I must differ, as I have worked the blooms which have been rolled into good merchant bars. The following is the analysis: Iron, 99·1988; silicon, ·400; carbon, ·150; phosphorus, ·0502; sulphur, trace; manganese, ·201; fracture, good.

A great deal has been said respecting the class of bricks to be used in the lining of these rotative furnaces. Experience has proved that the drum should have a 3½-inch fire-brick all around, the ends to have a few bauxite or magnesia bricks just where the balls are mostly wearing. After testing the magnesia bricks made at Landore side by side with the bauxite, I find that the magnesia stand the best. Added to this is an oxide lining of about 2 inches in thickness, made with scale and ore. Then I venture to state that, with proper care and management, the rotators can be kept in working order for at least three months without stoppage; at the end of that period, probably the rings may want renewing, which would only cause a delay of about three days; so that, the cost being so low and the output good, as the table shows, it must necessarily be a commercial success. It has been proved beyond doubt that the chemical results are all that could be desired.

The furnace is arranged in the following manner: The gas is made in two ordinary Siemens producers, size, 8 feet by 7 feet by 7 feet, which are at the back of the regenerators. The gas comes through a fire-brick flue straight into the furnace. There are two chambers filled with bricks forming a checker-work from top to bottom, size, 19 feet 6 inches high, by 7 feet 6 inches wide, by 10 feet long. These are called regenerators, and are worked alternately, the waste heat from the furnace passing through first one chamber, and then the other, for certain periods, making the checker-work hot; by this means, we get hot air, and thus the furnace is heated to a high temperature. The drum or rotator is 10 feet 4 inches diameter inside, and 10 feet 4 inches long; there are four 1½-inch diameter pipes for circulating water front to back, keeping the tubes cool, which have two large bends in for turning over he metal and for dividing it into five or six balls.

This is one of the greatest improvements that has been made since the working of plant at Towcester, as there is no danger now of having a sliding charge. There is also a water cylinder at the back of the furnace, connected with the front by means of the four 1½-inch pipes, which serves as a reservoir, for keeping top pipes full of water, and especially for keeping the ring and back end of the furnace cool.

The furnace is revolved on four wheels, driven by a small pinion, working in a large spur-wheel, which is in segments, and fixed to the furnace by means of brackets. The furnace is carried on a movable carriage for convenience of removing, for repairs, etc. The charge is taken up by elevators, and deposited in a tank during the time the furnace is working, and when ready to charge, a slide is removed, and the furnace is charged in about ten minutes.

Abstract Reports of Rotator at Landore.

Date.	No. of heats.	Charges. Particulars of charge.	Ore.	Coals for reducing.	Scale.	Coals delivered to gas-producers.	Product. Weight of blooms.
1882.		dys. hrs.	tns.	tns. ct. qr.	tns. ct.	tns. ct.	tns. ct. qr
May 22d, 6.30 A.M., to May 27th, 11.30 P.M.	32	5 5	32	9 12 0	19 14	38 0	35 8 2
May 31st, 8.30 A.M., to June 3d, 1.30 P.M.	20	3 5	20	6 0 0	12 0	24 0	22 4 1
June 5th, 6.30 A.M., to June 10th, 11.30 A.M.	32	5 5	32	9 12 0	19 14	37 0	35 2 2
June 12th, 6.30 A.M., to June 17th, 12.30 P.M.	32	5 6	32	9 12 0	19 14	36 0	34 19 1
June 19th, 6.30 A.M., to June 24th, 12.30 P.M.	31	5 6	31	9 6 0	18 12	34 0	33 3 3
June 26th, 10.30 A.M., to June 29th, 5.30 A.M.	23	3 19	23	6 18 0	13 16	25 0	24 7 0
July 3d, 9 A.M., to July 8th, 8 A.M.	30	4 23	30	9 0 0	18 0	33 0	32 0 0
		32 21	200	60 0 0	120 0	227 0	217 5 1

I give the following as an approximate cost of a ton of iron made by this process—that is, by working two rotators jointly:

	£.	s.	d.
Small Sommerostro ore, 1 ton, at 8s. per ton	0	8	0
Hammer or roll scale, 12 cwt., at 10s. per ton	0	6	0
Producer coal, 1 ton, at 7s. per ton	0	7	0
Reducing coal, 6 cwt., at 6s. per ton	0	1	9
Repairs and sundries, at 5s. per ton	0	5	0
Wages for labor, at 5s. per ton	0	5	0
Total	£1	12	9

NEW PUBLICATIONS.

ANNUAL REPORT OF THE COMMISSIONER OF MINERAL STATISTICS OF THE STATE OF MICHIGAN FOR 1881. Lansing, Mich. 8vo, pp. 266. (*Index.*)

Mr. Charles E. Wright's second annual report as Commissioner of Mineral Statistics of the State of Michigan is in many respects an improvement on the first so far as fullness of details concerning the copper and iron mines of the State are concerned. We have been particularly interested in the review of work in the copper mines, which we understand is from the pen of Prof. C. D. Lawton, because it is the only record of that kind which we possess in that form. The iron mines of the State have a very experienced and reliable local historian in Mr. Swineford, editor of the Marquette *Mining Journal*, whose annual review largely anticipates that of Mr. Wright. Both are valuable, and supplement one another so well that we would not like to miss either. Mr. Wright's report, although ostensibly for 1881, in reality gives the condition of the mines six months after the close of that year. The greatest interest, of course, attaches to the developments in the younger districts, some of which have rushed into prominence during the last few years. There are full accounts of the work done in the mines of the Teal, the North, and the Cascade ranges, the great Menominee range, the Felch Mountain, and the Agogebic districts, the latter two being the latest fields opened by prospectors.

The report on the copper districts is very full and complete, and is elaborated in much the same manner as it was during the preceding year. It shows a very great activity in the mining industry of that section, and gives promise of even greater returns during the coming year. We are informed by the very best of authority that the Lake mines will this year come very near a product of sixty millions of copper. The majority of the large producing mines have increased their output. Next year will witness a further addition, as the Conglomerate is getting ready for a large output, the Phœnix will do well, the Peninsula is equipping for 200 tons of rock per day, and the Wolverine is starting in in a moderate way.

We notice, with pleasure, that Mr. Wright has this year added gypsum, sandstone, clay, and coal to the subjects treated. So very little is known concerning the occurrence of coal in Michigan, and so little has apparently been done to develop it, that the opinion quite generally prevails that Michigan has no mineral fuel. The extent of the Michigan coal-field is embraced in a circle with a radius of fifty miles, having its center southeast of the village of St. Louis, in Gratiot County, and its southern boundary passing a few miles south of the city of Jackson. The coal formation has an estimated maximum thickness of about 300 feet, and what little exploration has been carried out has proved the existence of one workable bed, running as high as 4 feet in thickness. but averaging generally not more than from 2½ to 3 feet. The first discovery of coal dates back to 1835, when it was found in Spring Arbor township, Jackson County, and that mine, called the Hayden, was worked for some time; in 1857, a new mine, the Woodville, was opened near it, and some work was done for many years by the Detroit & Jackson Coal Company, which, however, shut down in 1872. Mining was resumed by lessees, R. H. Emerson & Co., in 1881. In 1879, a company was formed, called the Michigan, near the Woodville, and although considerably troubled by water, mining is going on as steadily as the car supply and the market will allow. The largest Michigan coal mine is

the Slope, opened in 1879, when 54,635 net tons were produced. In the following year, the output rose to 74,743 tons, but in 1881 fell off to 69,066, because the buildings were destroyed by fire. The only other mine working in Jackson County is the Eureka, begun in 1879. The total product of the county for 1881 is estimated at 130,530 tons. The only other mines in the State which are now in operation, besides those mentioned, are near Corunna, Shiawassee County. Work was done in a desultory way for many years until, in 1870, Youngstown capitalists took hold. The caving in of the shaft in 1875 stopped mining until, in 1878, a new mine was opened near the old one, but which proved unprofitable. In 1881, the sinking of a new shaft was begun under more favorable auspices. It is not expected that the coal mines of Michigan will ever possess more than a local importance. Still, it is of interest to note that this State, even though in a modest way, should rank among the coal-producing States in the country.

POWER versus HAND-DRILLING ON LAKE SUPERIOR.

Mr. Frank Klepetko, of the Northwest mine, now belonging to the Conglomerate Mining Company, of Philadelphia, has furnished the Commissioner of Mineral Statistics of Michigan with some interesting figures on the comparative cost of drifting by hand and by power-drills on the amygdaloid of that mine. These will supplement the data which we printed in our issue of August 29th, 1882, page 221, on the comparative cost on conglomerate rock.

The following table gives the comparative cost of drifting on amygdaloid :

Items.	Drifting by hand.	Drifting with power-drills.
Day's labor per foot (men)	$4.79	$2.18
" " (boys)	.....	.53
Contract cost per foot	11.95	10.04
Cost supplies per foot	2.07	4.12
Less profit on supplies, 25 per cent	.52	1.03
Net contract cost per foot	11.43	9.01
Compressor cost per foot	.....	1.64
Interest on compressing plant	.....	.62
Total cost per foot	11.43	11.17
Wages earned by miners per day	2.06	2.50
" " boys "	.....	.96

The wages were high, because the mine, at that time, in 1880, had not been working regularly, and better rates had to be offered to induce men to work. The compressor cost includes repairs on compressor and drills, wages of the men running the compressor, fuel, oil, packing, etc. The cost per foot drifted was obtained by dividing the compressor cost for the seven months that the Rand drills were running, by the entire number of shifts worked by the miners with the drills. This quotient was multiplied by 2·18, the number of shifts to each foot drifted. The cost is high because the full number of drills was not run continuously ; but on the other hand, the repairs were light. The interest on compressing plant was obtained by reckoning interest at 10 per cent for seven months on $15,000, including the whole plant and 10 drills. In 104 shifts, in one month, the advance was 21·07 feet for drifting by hand, and 47·07 feet by drills, or 2·2 times as much. The apparent saving is 26 cents per foot in favor of the drills, not taking into account the increased speed. This reduces the fixed expenses, such as salaries, pumping, etc., equal to a saving of $3000 per annum. An allowance must also be made for the fact that the hand drifts are carried through 6 feet by 5 feet, while the machine drifts are 7 by 8 feet or more. In ore-bearing ground, this amounts to an increase of excavation of from 3000 to 5600 cubic feet of rock per 100 feet of drift run, or 12 cubic fathoms. In the case of the Northwest, this would amount to $15 per cubic fathom, or $1.80 per lineal foot, which would reduce the cost of drifting with power-drills in ore ground to $9.37 per foot, or $2.06 less than hand drifts.

The following figures show the comparative cost of stoping with Rand drills when the work is done by contract by the fathom or by contract by the foot of hole drilled :

	By fathom, contract.	By length of hole, contract.
Day's labor per fathom (men)	$2.38	.....
" " " " (boys)	.98	.....
" " " " (miners)	.....	$1.71
" " " " (blasters)	.....	.35
" " " " (boys)	.....	.60
Contract wages per fathom stoped	5.54	3.30 (cost of holes)
Wages paid to blaster and helper	.....	1.06
Supplies used by miners	5.77	.33
Supplies used by blasters	.....	6.21
Compressor cost per fathom stoped	1.79	1.28
Interest on compressor plant	.67	.48
Total cost per fathom stoped	13.77	12.76
Less profit in supplies, 25 per cent	1.44	1.63
Net cost per fathom	12.33	11.03

In contracts per foot of hole drilled (12 cents per foot), the miners furnish light and the oil for the drill, while the company pays for power-drills, caps, and fuse, and hires the charger, who measures the depth of the hole when he inserts the charge. In contracts by the fathom, the men pay for all the supplies, and the company only furnishes the drills and the power to run them. By the latter method, the men earn $1.93 per day, as against $1.68 by the former ; the quantity of rock broken per drill and four men being 43·7 for the fathom contract to 60·8 for the other.

THE BULL DIRECT PROCESS.

A process for manufacturing iron and steel directly from the ore, invented by Mr. H. C. Bull, is attracting some attention in England. The furnace is worked exclusively with gas, delivered into it in a very highly heated state directly from the producers. Highly heated air is also introduced in sufficient quantities to burn about 10 per cent of the gas, and maintain the furnace at the high temperature necessary to allow the withdrawal of the iron or steel and cinder in a fluid state. Under this system, the gases rising through the ore and flux are carbonic oxide and hydrogen, in equal volumes, together with the nitrogen derived from the air which is blown into the furnace. These gases being produced entirely outside the furnace, there is no zone of gasification, but only the zones of fusion, reduction, and carbonization.

During the year 1881, the Société John Cockerill, of Seraing, Belgium, built an ordinary blast-furnace 6 feet in diameter in the bosh, and 21 feet high, fitted with Cowper hot-air blast stoves, and ordinary water-gas producers of the cupola type, when 3534 kilograms of iron were produced in twenty-four hours, under this process with the gas, as against 645 kilograms by means of the ordinary blast-furnace without the gas. The silicon was reduced from 3·40 to ·15, the sulphur from 1·61 to ·33, the phosphorus from 1·76 to 1·10, the manganese to *nil*, the combined carbon to ·52, and the graphite to ·17, which proved that the mildest grades of ingot iron and steel, suitable for rails, cutlery, and the highest class tools, could be produced from the most inferior ores directly in the blast-furnace. At the same time, the output from the furnace was increased enormously, and the quantity of fuel required was decreased in almost the same ratio.

THE WHITWELL STOVE FOR CHARCOAL FURNACES.

Mr. Horace E. Burt, manager of the Martel furnace, St. Ignace, Michigan, has written a very valuable letter giving the result of the work of Whitwell stoves for a charcoal furnace. This letter was contributed to the Charcoal Iron-Workers' Association, and is printed in the last issue of its well conducted *Journal*. Mr. Burt says :

This furnace is 53 feet by 10 feet 6 inches. There are two Whitwell stoves, each 60 feet by 15 feet. The fuel used is charcoal, made in round kilns, constructed of brick, arched or dome tops. These kilns, 30 in number, are located, 10 at Allenville, twelve miles distant, and 20 at Johnson, twenty-five miles distant from the furnace. The coal is transported in box-cars, and the receipts of one day used the next, being unloaded directly from the cars, over screens, into the coal-charging buggies. All coal, as well as all the ore, is weighed in the charging-buggies, on scales provided for the purpose.

The furnace was put in blast August 16th, 1881. Stoppage occurred at noon on the 25th, owing to an accident to the hoisting machinery, and continued until eight P.M. on the 29th. At time of stopping, the temperature of blast was 1000°. On starting up, the temperature was 800°, the result of extra firing with wood in the largest combustion-chambers of the stoves. In the following week, the temperature of blast went up to 1300°, when 266 tons of iron were put out with a consumption of 90 bushels charcoal to the ton of iron. Up to the end of September, 1882, the furnace had been in blast $322\frac{11}{24}$ working days, averaging about 40 tons of pig-iron per day for the time in blast. The $87\frac{13}{24}$ days of idleness cover stoppages for Sundays and for flue cleanings, and want of charcoal, including the 4 days and 8 hours for repairs, previously mentioned. I will give you a summary for the month of September last past :

In blast 24 days and 14 hours.

Ore used, 3,571,200 pounds ; percentage of yield, $59\frac{6}{10}$.

Coal used, 1,420,250 pounds = $1494\frac{1}{2}$ pounds per ton of iron.

Pig-iron produced, 2,148,090 = $950\frac{19}{22}\frac{9}{6}\frac{5}{0}$ tons pig-iron.

Of this output, $3\frac{1}{4}$ per cent was No. 1 ; $57\frac{1}{2}$ per cent, No. 2 ; $19\frac{1}{4}$ per cent, No. 3 ; 10 per cent, No. 4 ; $9\frac{1}{4}$ per cent, No. 5 ; and $\frac{3}{4}$ per cent, No. 6, pig-iron.

As to the temperature of the blast, the last week of September is a fair sample of each week in that month. On Monday, at one o'clock A.M. (time of putting on blast), the west stove showed 900° ; at six A.M., the same stove showed 1200°, after one change : at midnight, the same stove showed 1400°. The east stove kept pace with the west. There are regularly 12 changes in 24 hours. On Tuesday, the temperature, lowest, 1400°—highest, 1460° ; on Wednesday, the temperature, lowest, 1440°—highest, 1460° ; on Thursday, lowest, 1440°—highest, 1480° ; on Friday, lowest, 1440°—highest, 1500° ; on Saturday, lowest, 1440°—highest, 1480°. The vertical flues of the west stove have never been cleaned. In the east stove, after running six months, no dirt or soot was found, and the stoves respond as readily to the burning gas as they ever did.

It may not be generally known that this furnace was constructed with the settled purpose of resting on Sunday. In accordance with this principle, growing out of the religious convictions of the proprietors that it was their duty as Christian men, in the furnace business as well as in all other kinds engaging them, to rest the furnace and their employés on the Christian Sabbath, it has been the practice to cast at eleven o'clock Saturday nights and put the furnace in course of Sabbath observance by midnight, and so continuing until twelve or one o'clock on Monday morning. This practice has given general and positive satisfaction to all concerned, and I most cordially recommend the same to all furnace men. With the Whitwell stoves, it is entirely practicable. I deem it small excuse for any one with means ample for the construction of a modern furnace plant, to allow the extra expense of these stoves over cast-iron or any other than fire-brick stoves to stand in the way of the possibility of Sunday stoppages. It has been thought that the high temperature of the blast would prove injurious to the product. On the contrary, so far as our experience goes, no stronger iron is made. We are aiming to make the best brand of car-wheel and malleable iron, from Lake Superior ores, to be found anywhere.

As to strength, a test piece of size suitable to be tested in a Thurston torsion testing-machine, cast in the pig bed and broken from the under side of a soft 2-chill pig, on May 31st, is reported to have been turned up in the center to $\frac{5}{8}$ diameter × 1 inch long, and placed in D. F. & Co.'s machine at Erie, with the following result : 30,000 pounds per square inch tensile strain and 14° deflection before breaking. The cast from which this was taken was made on a temperature of 1360 of blast, the engine making 16 and 17 turns.

There is one matter which I am inclined to touch upon before closing. At the last annual meeting, I noticed the discussion as to the value of dolomite as a flux. We have used nothing else since going into blast. Our limestone is quarried within a quarter of a mile of the furnace. It shows by analysis 55·55 per cent of carbonate of lime, 41·72 per cent of carbonate of magnesia. We are using about eighty-eight pounds to the ton of iron, a very low percentage. It may be, some of the members can vouch for the correctness of my theory, that while dolomite is an excellent flux for the ores I am using, it is the active enemy of the hearth-bottom, which has during the time of this blast been eaten out to a depth of eighteen inches. The hearth-bottom was originally a double layer of eighteen inch brick. It has been found necessary to drop the cast ng trough low enough to draw off the iron from the surface of the first layer of bottom brick.

GENERAL MINING NEWS.

ARIZONA.

COCHISE COUNTY—TOMBSTONE DISTRICT.

Recent dispatches state that work on the Phœnix mine has been resumed. This mine adjoins the Stonewall and Contact mines, and bids fair to become a good producer. The force of miners on the Lucky Cuss has been reduced. There is enough ore in the bins to keep the smelter running for two months. The hoisting-works from the French mine, at Harshaw, are on the road to this point, for the Ingersoll mine. Thirty-three tons of ore from the Little Devil netted $1100, after all expenses were paid, at the Head Center mill. The Bunker Hill, Rattlesnake, and Mammoth claims were sold a few days ago for $60,000. Work on the Grand Central South is to be resumed on the return of Lieutenant Hall. The Gilded Age has resumed work.

GILA COUNTY.

MACK MORRIS.—Work has been stopped on this mine, and the company is taking ore out of the La Plata, an adjoining claim.

OLD DOMINION.—Operations at the smelting-works are satisfactory, and the mine offers an abundance of ore. A dispatch says that Colonel Newcomb, of the Emeline Mining Company, and Frank Simpson, who is interested in the Old Dominion Copper Company, are now there examining the mines.

TACOMA.—This property shows good prospects. The company has leased the Carrie furnace, and is accumulating ore and coke on the dump, with a view to produce copper at an early day.

CALIFORNIA.

The San Francisco *Bulletin*, in speaking of the mining interests of California, says that the past year has been one of fair prosperity. The quartz claims have averaged well. The gravel claims have been embarrassed to some extent by the *débris* question. The product of some of these claims this year has been much less than formerly. If the mine-owners can devise some way of taking care of the sand washed down in the pursuit of gold, their work will go on the same as of old. But until that question is settled, and settled in a way satisfactory to agriculturists, there will be impediments to the full and free development of the gravel claims of the State. Quartz mining holds its own quite well, and is likely to be one of the prominent industries of the State for some time. Mines of this character are now open in about twenty counties. The facilities for getting the rock and extracting the precious metal are every year becoming perfected and cheapened. During the past year, 68 mines levied 121 assessments, amounting to $1,547,467; in 1881, 93 mines levied 151 assessments, amounting to $2,237,850. The total amount of dividends paid in 1882 amounted to $1,715,408, as against $2,654,734 paid in 1881.

INYO COUNTY.

INYO CONSOLIDATED.—The mill at Darwin was burned to the ground on the evening of December 19th. It was erected in 1874-75 by the Surprise Valley Water Mining and Milling Company. It is said to have cost the present management about $50,000, and was insured for $40,000.

PLUMAS COUNTY.

TAYLOR-PLUMAS.—The mill is almost finished, and will start up early in January. In the mine, work is pushed ahead as rapidly as possible, and new ground is opening up that will supply a large amount of ore as soon as needed. The ledge continues to maintain the same average width, and looks as well as heretofore.

CANADA.

NOVA SCOTIA.

BOSTON & HALIFAX.—This company, whose property adjoins the Hall-Anderson, has contracted for its machinery, and it is expected it will be in place when the road is finished, or soon thereafter.

HALL-ANDERSON.—Despite the late fall of snow of about fourteen inches, the work on the government road to the Hall-Anderson mine is still in progress. It is expected that it will be finished in the next sixty days. The new hoisting-works are now in operation, and the Orion lode is steadily improving. The mill is temporarily idle to admit of putting in a new heater for the water supply for the batteries.

NONPAREIL.—Active developments on the Nonpareil property, which also joins the Hall-Anderson immediately on the west, are in progress, and the Leslie lode, which is partially developed on the Hall-Anderson, has been tapped at various points covering a distance of six hundred feet. The lode is about two feet thick, and in every opening, thus far, shows free gold in paying quantities.

OXFORD.—The Oxford Company has received a gold brick of $2550 from ten days' run of its ten-stamp mill. The contract-work for sinking the main shaft seventy-five feet deeper is now in rapid progress, with the aid of the new steam-pump, which is working satisfactorily, and the lode is gradually increasing in width and quality. A test lot of ore from the newly-discovered Split lode will be milled, and, from the appearance of the quartz, large results are expected. Sinking has been commenced upon the Oxford lode, and the company is preparing to put hoisting-works upon the same.

STATHER.—Recent developments upon the Stather property which lies north and west of the Oxford, prove it to be of extraordinary promise. Negotiations are in progress for the purchase of this property, and it is expected that in the spring twenty stamps will be in operation thereon. From the developments thus far, this district seems destined to mark a new era in Nova Scotia gold mining, from the fact that, whereas in other districts the gold is notably coarse, it is here fine gold as a rule, and the milling results of the ore prove the yield to be much more uniform than in any other district in the province.

COLORADO.

The Denver *Tribune* gives the following table of the bullion product of Colorado for 1882:

County.	Amount.	County.	Amount.
Boulder	$550,000	La Plata, San Juan	$675,000
Chaffee	225,500	Ouray	329,760
Custer	705,116	Park	283,564
Clear Creek	2,001,629	Pitkin	100,000
Dolores	125,000	Rio Grande	310,000
Fremont	19,950	Routt	100,000
Gilpin	2,006,516	Saguache	52,000
Grand	10,000	Summit	1,250,000
Gunnison	600,000		
Hinsdale	275,000	Totals	$23,750,898
Lake	17,131,853		

The product for 1881 was $22,203,509, showing an increase this year of $4,547,389.

The following statement shows the business of the smelting-works named during 1882:

Golden Smelting-Works, Golden.

County.	Tons.	Gold.	Silver.	Lead.	Total.
Clear Creek	1,921	$4,133	$282,335	$33,386	$319,854
Gilpin	3,602	117,380	38,940	10,320	166,641
Boulder	463	66,141	25,213		91,354
Lake	812		32,296	23,422	55,718
Summit	75		7,702	2,503	10,205
All other sources	106	3,249	7,492	4,644	15,386
	6,979				$659,161

Boston & Colorado Smelting-Works, Argo.

County.	Gold.	Silver.	Copper.	Total.
Gilpin	$364,000	$98,000	$93,000	$555,000
Clear Creek	26,000	509,000	23,000	558,000
Boulder	140,000	82,000		222,000
Lake		336,000		336,000
Summit		443,000		443,000
Park	6,000	96,000		102,000
Gunnison		136,000	3,000	139,000
Custer	126,000	93,000		219,000
San Juan country	4,000	83,000	8,000	95,000
Montana	7,000	538,000	159,000	704,000
Utah	12,000	85,000	84,000	181,000
Arizona		16,000	2,000	18,000
New Mexico		59,000	7,000	66,000
All other sources	2,000	21,000	7,000	30,000
Total	$687,000	$2,595,000	$386,000	$3,668,000

The production for 1881 was $3,081,000; increase this year, $587,000.

Miners' Smelting-Works, Golden.

County.	Gold.	Silver.	Copper.	Total.
Lake and Park	$2,350	$166,060		$168,410
Gilpin	105,763	19,500	$12,850	138,113
Clear Creek	32,350	291,285	17,134	340,769
All other sources	14,270	20,430	15,648	50,348
Total	$154,733	$497,275	$45,632	$697,640

Moore Mining and Smelting Company, Golden.

The statement published below is from the 1st of January, 1882, to the 31st of October, 1882, the works having closed down at that date for the purpose of changing and enlarging their capacity:

County.	Tons.	Gold.	Silver.	Lead, Copper.	Total.
Gilpin	3,410	$72,740	$59,857	$4,528	$137,126
Clear Creek	1,166	2,742	223,712	9,276	235,730
Lake	800	3,605	24,742	7,655	46,003
All other sources	665		70,792	2,750	73,542
Total	6,041	$79,087	$389,103	$24,209	$492,401

The production for 1881 was $678,505.

Grant Smelter, Denver.

The production of these works for seventy days of 1882 was as follows:

Locality.	Gold.	Silver.	Lead.	Totals.
Arizona		$123,000	$3,000	$126,000
New Mexico	$20	10,000	600	10,620
Idaho Territory		500	200	700
Clear Creek County	460	1,600	1,200	3,200
San Juan County	4,000	17,200	6,100	27,300
Chaffee County	200	4,000	2,000	6,200
Pitkin County		2,200	1,700	3,900
Custer County	18,300	5,600	400	27,300
Park County	3,100	7,100	2,600	12,800
Summit County	300	4,500	2,800	7,600
Ouray County	800	12,300	2,500	15,600
Gilpin County		3,500	300	3,800
Gunnison County		900	300	1,200
Boulder County	800	300	700	1,800
Lake County		558,000	512,400	1,070,400
All other sources	1,500	16,000	4,300	21,800
Grand total	$29,420	$766,700	$541,100	$1,337,220

BOULDER COUNTY.

WARD H. LAMON.—This lode, the extension of the Mountain Lion mine, is worked extensively. It is yielding immensely, the nature of the mineral being a very soft, decomposed pay, over a foot wide, milling 15 ounces gold per ton.

CLEAR CREEK COUNTY.

The bullion production of this county for the year 1882 is said by the Georgetown *Miner* to have amounted to $2,001,629.

DIAMOND TUNNEL.—The tunnel has cut a five-foot vein of mineral at its intersection with the Corry City lode, which assays from 42 to 821 ounces silver per ton. Work will be begun on the vein as soon as the tunnel head is far enough advanced to admit room.

LAKE COUNTY.

The following table gives the bullion output of Leadville for the year ended December 30th, 1882:

Quantity.

	Pounds of bullion.	Pounds of lead.	Tons of ore.	Ounces of silver.	Ounces of gold.
Total first quarter	23,487,782	23,380,743	12,924	2,042,323	3,056
Total second quarter	20,510,096	20,415,647	12,175	1,818,596	2,386
Total third quarter	22,713,006	22,605,015	28,050	1,743,876	6,548
Total fourth quarter	19,747,085	19,646,027	36,953	1,648,454	3,923
Total for year 1882	86,457,349	86,047,412	90,101	7,273,249	16,413

Value.

	Value of lead.	Value of silver.	Value of gold.	Value of ore.	Total value.
Total first quarter	$1,169,037	$2,328,248	$61,120	$485,762	$4,044,167
Total second quarter	1,020,779	2,093,301	49,720	599,059	3,773,772
Total third quarter	1,130,251	1,988,142	130,960	1,326,111	4,575,334
Total fourth quarter	942,977	1,827,561	78,457	1,885,131	4,734,129
Total for year 1882	$4,263,044	$8,237,252	$320,257	$4,296,066	$17,127,402

Total for 1881 amounted to $13,170,576, showing an increase this year of $3,956,826. In figuring the commercial value of the last quarter's product, silver is calculated at $1.11 per ounce, and lead 4·8 cents per pound. Previous productions were calculated on a fair average of the ruling quotations at the time.

CHRYSOLITE.—The results obtained in the recent concentrating experiments are said to be satisfactory. They show that a high percentage of lead is saved; that working without settlers or buddling a fair percentage of silver is saved; and that the ore is beneficiated, that is to say, silica is lost and the percentage of iron increased. The experiment has been made on lots of ore weighing over one hundred tons in all. As a rule, eight tons have been concentrated into one. The result on one lot of forty-five tons yielded the following results: The original lot assayed in silica 36 per cent; in iron, 25 per cent; and in lead, 2 per cent. The concentrates assayed in silica 18 per cent; in iron, 30 per cent; and in lead, 15 per cent. The concentrates have been sold to Cummings & Finn as fast as made.

SAGUACHE COUNTY.

HORTENSE.—Another strike is reported. Out of 500 pounds of ore, the mill returns gave 1017 ounces in gold and 524 in silver, aggregating over $20,000.

SUMMIT COUNTY.

GREER SMELTER.—Operations will be resumed shortly. The smelter is closed at present for the purpose of putting in jigs.

WHITE QUAIL.—It is stated that this company will resume work.

DAKOTA.

CALEDONIA.—The superintendent reports for the week ended December 24th: Ore produced, 1050 tons. Header advanced five feet; total, twenty-six feet. North drift advanced eight feet; total, thirty feet. Have let contracts to run header and drift, as it can be done cheaper than by day's pay.

FATHER DE SMET.—The superintendent reports under date of December 19th,

as follows: Herewith express company's receipt for bar No. 149, containing 1263$\frac{33}{100}$ ounces gold bullion, the result of run of mill for the first half of December. On the 15th, I drew for $21,500, which amount was for all expenses of November. The mill is doing good work. The rock-crushers require much repairing, on account of the hardness of the ore we are now working. The mine is looking well at all points where work is done, and good results may be expected during the winter.

IDAHO.

The business depression, says the Idaho *Avalanche*, which has existed in the community for the past two months by reason of the condition of the roads, has ceased, and we can now look forward for some activity in mining matters.

IDAHO DEMOCRAT.—The shaft is down 105 feet, in the ledge, which shows up five feet in width, one foot of which is solid galena. At the depth of 60 feet, the shaft is intersected by a tunnel, which secures good ventilation.

MAINE.

SULLIVAN.—The mill has shut down for the winter, after a successful run of several months. Work in the mine is at present concentrated in the Waukeag shaft, which is driven night and day by three eight-hour shifts. The present depth is about 360 feet. Twenty-five men are employed.

TWIN LEAD.—The directors held a meeting in Bangor recently, at which it was decided to resume operations at the mine at once. A large force will at once be put on, and work will be carried forward vigorously.

MEXICO.

The Magistral Copper District, in the Magistral range, 25 miles north of Chihuahua, on the line of the Mexican Central Railroad, under recent developments, is reported to be yielding ore assaying 60 per cent copper and 1300 ounces silver to the ton.

From Vaca Ortiz, Durango, Mr. George Wilson writes us, under date of December 7th:

Within the last few weeks, the usual winter influx of miners and prospectors, driven from the north by snow and cold, has begun to reach this more favored section of the great mining region of the Rockies. Many capitalists, seeking for good and, at the same time, cheap mines, have also put in an appearance, some of whom have bought, others bonded, and still others have already begun work on their pr perty. At Guanacevi, the Peoria (Illinois) Company, under the able control of Messrs. Gift, manager, and Hotchkiss, superintendent, is making fair progress, and its operations are meeting with the most gratifying results. On one of its seven mines, the Leon, it is driving a tunnel or drift on the course of the vein, showing up from 10 to 12 feet wide of ore. The assays from this mine have so far run over 200 ounces per ton; sometimes over 400 ounces silver per ton has been the yield. Above this drift, it has over 500 feet of ore in hight, by 2000 feet along the vein, which has been thoroughly proved along its outcrop by numerous shafts from 50 to 100 feet deep. The company has six other mines, all of which are known to be valuable, and by good miners who know each one they are said to be each as valuable as the Leon. This company was the pioneer in Guanacevi, and was fortunate enough to secure its property for less than $300,000; and the actual cost of the work which has developed such a noble ore-body does not exceed $5000. Within the last week, over thirty mines have been bonded or bought in Guanacevi, and it seems as if it would prove the Comstock of Durango.

At Metates, the famous Candelaria seems about to enter on a new period of prosperity. In the hands of its late Mexican owners, who were completely sated by its twenty years of rich yields, the proper development-work in advance of ore-extraction had been somewhat neglected, and with the usual results of such a course; but under the new administration, the most satisfactory results are becoming apparent. In the lower tunnel, which, near its northern extremity, was driven at first on 100-ounce ore, the mineral has recently improved to from 800 to 1000 ounces silver per ton, with a 15-foot face in the drift. The present owner has, in less than two months' work, paid off the arrears of debt of the previous year, left him as a legacy by the former owners. The neighboring mines are opening up with good results, and here again is an excellent opportunity for investment in mines which will pay "to work" as well as "to sell."

Northern capitalists have also been here recently, looking up the prospects for successful cattle-raising, and so thoroughly well pleased were they with the outlook that they entered into a contract for some 300,000 acres of land, and are about returning home to arrange for at once stocking it with from 50,000 to 60,000 head of cattle. As cattle doubled in value here within the last year, and are fully expected to advance another $10 per head this year, it is clear they have a good thing in hand.

MICHIGAN.

The Concentrating Company, says the Marquette *Mining Journal*, shipped a product of 1177 tons of concentrated ore as a result of an experimental run of its works at Negaunee—a fact which proves conclusively that the works are a success, or can, with a few changes, be made such. The works are now idle, and will remain so until spring, it being the intention to make some necessary changes and improvements during the winter.

NATIONAL.—This mine, which has recently been unwatered, shows, says the *Miner*, a good block of ground in the bottom drift, both east and west of the shaft. A large amount of work remains to be done, however, before the workings will be in shape for an active prosecution of mining operations.

TAMARACK.—The Houghton *Mining Gazette* says that the shaft has passed through the well-charged copper lode which was struck a few days ago. The deposit, as seen in the shaft, gives every indication of being highly metalliferous, and will no doubt receive exploration on its length in due time.

MONTANA.

SUMMIT VALLEY DISTRICT.

The Butte *Miner* reports as follows:

ALICE.—Development-work is prosecuted on the 700 and stoping as usual on the upper levels. A large force is working the Magna Charta, and 40 tons of ore per day are hoisted. The high-grade ore mentioned recently as being uncovered in the north drift of the 200 and 300 holds out as to quantity and grade. Work is prosecuted in the winzes from both these levels, to run down on the ore-body, and another winze has been started from the 400-foot level, to intercept the ledge.

ANACONDA.—It is expected the new works will be completed by January 1st, when active underground operations will be commenced. At present, a large amount of surface work is doing.

CLEAR GRIT.—The chute of high grade in the west 217 holds good, and hoisting from this ore-body will be started soon. A track has been laid in the 217, to facilitate handling the ore, and a stull stope is pushing through from the shaft to the face of the drift, to improve the air-current. A level has also been started on the hanging-wall side of the ledge, to open out the west drift.

COLUSA.—A full force is worked in the stopes of the 260-foot, where a large body of high grade ore has been uncovered, some of which is shipped East for reduction, being sufficiently high grade, both in silver and copper, to make the shipments profitable.

LEXINGTON.—Sinking for a 500-foot level is vigorously prosecuted. The stopes of the 200 and 300 are producing their usual output of ore, and the mill is making a steady run.

MOULTON.—During the week, a winze has been started from the 200 at a point 200 feet east of the air-shaft, and directly under the big body of ore penetrated in sinking that shaft; a 2½-foot vein has been uncovered in the new winze, which mills 50 to 60 ounces. On the 300, in the cross-cut to the south vein, 575 feet west of the main shaft, soft ground has been struck after having run through a very hard reef of rock. The cross-cut has reached a point 75 feet south of the center vein, and it is expected the big vein which showed on the surface at that point will be penetrated any day. Progress in drifting on the 500 has been slow during the past week, the quartz being very hard and the water in the breasts troublesome.

ORIGINAL.—Sinking is to be pushed vigorously, in order to open the 300, 400, and 500 levels. The mine has heretofore been worked only to the 200-foot level.

NEVADA.

The joint Ophir-Mexican winze has passed through porphyry boulder into quartz again. The cross-cut east in the Sierra Nevada and Mexican shows no material change. The diamond drill will be started next week in the east cross-cut on the 2700 level of Sierra Nevada. Quartz carrying metal has been cut in the joint Savage-Norcross drift on the 2600 level. The fire in the Sutro Tunnel is reported to have done little damage.

NEW MEXICO.

A new mining district, known as the Hueco, has been organized about forty miles southeast of Shedd's Ranch, in the East Organs. The vein croppings assay $70 gold per ton.

MAGDALENA.—The Lake Valley *Herald* says that this company has just concluded a contract for 10,000 tons of ore from the famous Hardscrabble mine, to be delivered as quickly as possible, and that the smelter will begin active operations on the 1st of January. A contract has also been concluded for the product of the Junieta mine. One smelter of forty tons capacity is all ready for the ore, and another of equal capacity will be erected by this company at once.

SHAKSPEARE SMELTER.—A $40,000 smelter and refiner has been contracted for at Deming.

TORRENCE.—This company is said to be negotiating for neighboring property on Socorro Mountain.

VALVERDE MINING AND SMELTING COMPANY.—The following figures show the production of copper for the months mentioned:

Month.	Pounds of ore.	Pounds of matte.	Pounds blister.	No. of furnace run.
June	311,600	31,825	6,793	1
July	224,910	48,887	29,876	1
August	471,699	102,534	64,855	2
September	403,243	84,340	68,741	2
October	505,533	57,235	38,556	3
November	276,630	57,578	39,978	2

NEW YORK.

BENSON GRAVEL MINING COMPANY.—Extensive operations will be begun on this property, situated in Fulton County, shortly. Owners of gold mining prospects in the Adirondacks are awaiting with considerable anxiety the beginning of this work, as it is supposed that it will furnish an important test of the mineral value of the Adirondack region.

PENNSYLVANIA.

A large deposit of mica was recently discovered on the South Mountain, Berks County. The present lessee is said to have been offered $100,000 for his lease.

TENNESSEE.

EAST TENNESSEE VALLEY ZINC COMPANY.—This company, which organized a short time ago with a capital of $300,000, has let contracts for the erection of the furnaces and buildings in Knoxville. Several thousand tons of zinc ore are already on the dump a few miles from Knoxville. The furnaces will be in operation by next spring.

UTAH.

The Salt Lake *Tribune* says:

EMMA.—Twenty men are employed, sinking the shaft at the head of the Bay City tunnel. The new engine for hoisting, placed near the shaft, has been in operation some time, and works finely. The shaft is down 90 feet, and is to be driven 200 before cutting a station. At that depth, the vein will be cut, provided the dip remains the same; if not, it will be drifted for. Very little water has been encountered as yet. Work will go on all winter.

MAMMOTH.—Six furnaces are now running; two more are to be started shortly; and the number is to be increased to seventy-six. When the furnaces are all up, they will reduce 200 tons of ore per day, and by buying ores that can be had in plenty in the district, the company expects to combine qualities which will, with its own, make a perfect flux.

YOSEMITE.—The concentrator started up last week. It has a capacity of eighty tons a day. Its operations make available much low-grade ore in the Bingham District, which has long waited some such cheap and thorough process as this.

VERMONT.

A correspondent of the Boston *Journal* states that the amount of marble quarried, sawed, finished, and sold in 1882 by the Rutland dealers and companies was 5,000,000 two-inch feet. The average price received per two-inch foot was 40 cents, or an aggregate sum of $2,000,000 for the year's product.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

GRANTED DECEMBER 26TH.

269,525. Cable Tramway. Charles M. Huson, St. Louis, Mo.
269,563. Ore Concentrator and Amalgamator. William P. Davis, Spring City, Nev.
269,573. Rolling-Mill. Uri Haskin, Pittsburg, Pa.
269,574. Gearing for Trains of Metal Rollers. Uri Haskin, Pittsburg, Pa.
269,583. Boring-Machine. Fritz Kade, Sandusky, O.
269,599. Regulator for Compressed Gas. Julius Schülke, Berlin, Germany.
269,616. Composition for Removing Scale in Boilers. Charles R. Bacon and Frank Queen, St. James, Minn.
269,619. Rock-Drill. William J. Barber, Covington, Ind.
269,626. Union or Coupling for Pipes and Tubes. Julius L. B. Bodel and Joseph L. F. Brauer, Paris, France.
269,632. Mining Machine. Richard Bromley, Columbus, O.
269,640. Fuel. James M. Cooper, New York City.
269,645. Dry Amalgamator. Affonso de Figaniere, Philadelphia, Pa., Assignor of one half to John W. Bailey, Denver, Colo.
269,667. Ore-Pulverizer. August Heberle, Sala, Sweden.
269,676. Portable Pump. William J. Johnson, Newton, and Frank C. Johnson, Boston, Mass.; said William J. Johnson Assignor to the National Manufacturing Company, Worcester, Mass.
269,690. Boiler and Furnace. James H. Mackintosh, Paterson, N. J.
269,720. Furnace. Claus Russmann, Hamburg, Germany.
269,730. Apparatus for Compressing and Pumping Air. Elmer S. Smith, Erie, Pa., Assignor of one half to Ray V. Pierce, Buffalo, N. Y.
269,739. Mining-Auger. William N. Talley, Hampton, West Va.
269,742. Hydraulic Process of and Apparatus for Reducing and Concentrating Metallic Ores. Francis Taggart, Brooklyn, N. Y.
269,787. Machine for Rolling Rails. Uri Haskin, Pittsburg, Pa.
269,813. Gas-Engine. Lewis C. Parker, Robinson, Kan.

BY the unanimous consent of the stockholders, the name of the Northwestern Reduction and Chemical Works has been changed to the Chicago Copper Company. The brand of the copper produced in its refining operations will be "Chicago Copper." The officers are Charles Ray, President; D. S. Wells, Vice-President; H. L. Norton, Treasurer; P. P. Austin, Secretary; and W. R. Roney General Manager.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Jan. 5.

There is nothing of interest to report at the Mining Exchanges. Most of the business has been monopolized by the Pipe Line certificates, and what has been done in mining shares is almost featureless. Sierra Grande has grown remarkably weak under large transactions, and fallen to its lowest price to-day. It recovered, however, and closed steady. The low-priced stocks have fallen off considerably in business, but prices have been steady. The Leadville stocks have been strong, and the Comstocks show a little improvement under small transactions. Robinson Consolidated continues to do a large business, but has been very irregular. Below will be found a summary of the market. The sales of mining shares at all the Exchanges aggregate 419,070 shares, as against 376,710 last week.

The Comstock shares have been very quiet at about steady prices. California has been quiet and steady, selling from 20@24@23c. Consolidated Virginia records a moderate business at stronger prices; it sold from 38@47c., with a business of 7900 shares. Sierra Nevada was quiet and steady, selling from $3.50@$3.75, assessment-paid shares, and from $2.25@$2.63, assessment-unpaid shares. Union Consolidated sold to the extent of 300 shares at $2.90. Mexican was quiet and strong at $2.50@$3.15. Ophir sold at $1.80 and Consolidated Imperial at 2c. Sutro Tunnel had an active business at irregular prices, selling from 17@25@20c.

The Leadville stocks were quiet at strong prices. Amie had an active business and was strong, selling from 14@20@19c. Chrysolite was also strong, under a moderate business, selling from $1.50@$1.40, with a business of 6100 shares. Hibernia sold at 1c. @2c. Iron Silver, under a moderate business, was a little weak; it sold from $2.40@$2.30. Little Chief was quiet and steady, selling from 40@38c. Little Pittsburg records transactions of 1100 shares at 65@60c. Big Pittsburg was quiet and steady at 10@14@13c.

The Bodie stocks were very quiet and irregular. Bodie sold from $2.25@$2.10@$2.20, with transactions of 250 shares. Standard records only one small transaction at $6¼. Bulwer was quiet and irregular, selling from $1.20@90c.@$1.05.

The Tuscarora stocks were quiet and strong. Grand Prize sold at 30c. Tuscarora was very quiet at 8c. Belle Isle records only moderate transactions at steady prices, selling at 56@58c. Navajo was quiet and strong, selling from $8⅛@$8½, with a business of 1600 shares. North Belle Isle, with small transactions, sold at 40c., assessment-paid shares, and at 20c., assessment-unpaid shares. Independence was very quiet at 61c.

In the miscellaneous list, the Green Mountain stocks have been very quiet at steady prices. Gold Stripe sold at 5@4c. Green Mountain, at 41@39c. Rising Sun, at 6@7c. Cherokee, at 6c. Hall-Anderson had a fair business at strong prices; it sold from $1.25@$1.55. Horn-Silver was very quiet at $6.63@$6.38. Hukill, under a moderate business, was strong at 14@15c. Robinson Consolidated had an active business at very irregular prices; the sales aggregate 44,400 shares at $1.20@$1.40@$1.30. Sierra Grande has been the most active stock on the market, but has been very weak; it sold from $3.70 @$2.55, closing to-day at $3.

Alta-Montana declined slightly from its strong price, under a moderate business, and sold from 29@25c. Barcelona was very active on the American Board at irregular prices, selling from 23@28@22c. Bradshaw was quiet and a little weak, selling from 40@36c. Caledonia, B. H, had a small business, but was weak; it sold from $1.20@$1. Central Arizona was quiet and steady at 39@37c. Decatur records an active business at steady prices; it sold from 10@9c. Elko Consolidated was quiet and steady at 9c. Hortense, with a moderate business, was steady at 11@10c. Oriental & Miller had an active business at steady prices, selling at 13@12c. Silver Cliff has been a little weak, under a moderate business, selling from 38@35c. South Pacific was active and steady at 10@9c. The State Line stocks have been fairly active at steady prices; Nos. 1 and 4 sold at 3c., and Nos. 2 and 3 at 8@6c. Taylor-Plumas records a very active business at the American Board, at prices a little weak; it sold from 23@19c. Fannie Barrett is the name of a new mine on the American Board this week, and has sold to the extent of 1900 shares, at $2@$2.05.

The Excelsior Water and Mining Company has levied an assessment of one dollar and fifty cents per share, payable immediately and delinquent January 29th.

MEETINGS.

Northern Chief Mining Company, No. 2 New street, New York City. Annual meeting of stockholders and election of trustees January 10th at twelve o'clock M.

South Silver King Mining Company, Room 84, Tribune Building, No. 154 Nassau street, New York City. Annual meeting of stockholders and election of trustees, January 13th. Polls open at three P.M., and close at four P.M.

Torrence Mining Company, Room 31, No. 3 Broad street New York City. Annual meeting of stockholders and election of trustees January 10th, at twelve o'clock M.

Vandewater Gold and Silver Mining Company, Room 147, No. 115 Broadway, New York City. Annual meeting of stockholders and election of trustees, January 9th, at eleven o'clock A.M.

DIVIDENDS.

The Castle Creek Mining Company, of Idaho, has declared dividend No. 8, of three per cent, payable January 16th. Transfer-books close January 10th, and open January 17th.

The Prussian Mining and Milling Company, of Colorado, announces its regular monthly dividend (No. 10.) of ten cents per share, payable January 10th, at the office of Simpson & Son, No. 18 Wall street, New York City.

The Shoshone Mining Company, of Idaho, has declared its regular monthly dividend (No. 2) of one per

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	SHARES. No. in 1000's	SHARES. Par Value.	ASSESSMENTS. Levdtodate in 1000's.	ASSESSMENTS. Date and amount per share of last.	DIVIDENDS. Total paid to date in 1000's.	DIVIDENDS. Date and amount per share.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. Dec. 30. H.	Dec. 30. L.	Jan. 1. H.	Jan. 1. L.	Jan. 2. H.	Jan. 2. L.	Jan. 3. H.	Jan. 3. L.	Jan. 4. H.	Jan. 4. L.	Jan. 5. H.	Jan. 5. L.
Alice, Mon..	400	25	*	....	40	De 81 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Amie Con., Co....	500	10	*	....	305	My 80 12	.14	.....	.....	.....	.15	.14	.15	.....	.19	.17	.20	.18
Atlantic, Mich....	40	25	280	Ap 75 1 00	140	Fe 82 2 80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Argenta, Ne....	100	100	225	No 82 25	40	Fe 80 20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bar & Walker, Ut.	100	10	*	....	60	No 80 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bassick, Co.....	100	100	*	....	25	Fe 80 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belle Isle, Ne....	100	100	65	My 82 10	300	De 79 25	.....	.....	.....	.....	.....	.....	.....	.....	.56	.....	.58	.....
Black Bear, Ca...	30	100	15	Se 79 50	80	Se 82 30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belmer, Ne.....	104	100	2562	Se 82 25	15397	Ap 76 1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bodie Cons., Ca..	100	100	125	De 81 50	1295	No 82 20	.....	.....	.....	.....	2.25	.....	2.10	.....	2.10	.....	2.20	.....
Bos'n & Mon, Mon.	200	10	...	....	310	Ja 83 05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Breece, Co.....	200	25	*	....	2	Fe 80 1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bulwer, Ca.....	100	100	20	De 77 50	140	Ja 83 10	1.20	1.00	.....	.....	.90	.....	.....	.....	.....	.....	1.05	.90
California, Ne....	540	100	628	No 82 50	31324	De 79 50	.20	.....	.....	.....	.....	.....	.21	.....	.24	.20	.23	.....
Cal. & Hecla, Mich.	100	25	...	....	22550	No 82 5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cariboo Con., Co.	100	10	*	....	50	Mr 80 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Carolina Q'n, N.C.	100	2	...	....	8	Oc 82 02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Castle Creek, Id..	100	1	...	....	24	Ja 83 03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Catalpa, Co.....	300	10	*	....	210	De 82 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central, Mich....	20	25	100	Se 61 6	1610	Fe 82 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chrysolite, Co....	200	50	*	....	1900	De 81 50	1.50	1.40	.....	.....	1.50	1.45	1.45	.....	1.45	.....	1.50	1.40
Climax, Co.....	200	10	*	....	180	Au 80 30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.10	.....
Cons. G. Mg., Ga.	100	5	*	....	80	De 82 04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cons. Va., Ne.....	540	100	897	Au 82 30	42930	Au 80 50	.40	.38	.....	.....	.40	.....	.45	.44	.46	.42	.47	.....
Contention, Ariz.	250	50	...	....	2087	De 82 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Copper Queen, Ar.	250	10	*	....	850	Ja 83 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crown Point, Ne.	100	100	2673	Fe 82 25	11688	Ja 75 3 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dalw'd-Terra, Dk	200	25	*	....	880	De 82 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunkin, Co.....	200	25	*	....	200	Ju 81 7½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka Cons., Ne.	50	100	100	My 76 1 00	4817	Jy 82 25	.....	.....	.....	.....	.....	.....	.....	.....	9.00	.....	.....	.....
Evening Star, Co	50	10	*	....	1225	Oc 82 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Excelsior, Ca.....	100	100	300	Ja 82 1 00	875	Oc 81 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fa. de Smet, Dk..	100	100	...	....	530	De 82 20	4.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Findley, Ga.....	200	1	*	....	8	My 79 1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Freeland, Co....	200	25	*	....	50	My 80 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glass-Pend., Co..	250	20	*	....	25	My 81 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Stripe, Ca..	150	10	*	....	76	Jy 81 15	.05	.....	.....	.....	.....	.....	.05	.....	.05	.....	.04	.....
Gold & Curry, Ne.	108	100	3473	Se 82 50	3826	Oc 70 $10	.....	.....	.....	.....	.....	.....	.....	.....	.30	.....	.30	.....
Grand Prize, Ne..	100	100	420	No 82 25	450	Se 80 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Great Eastern, Dk	300	1	*	....	16	Jy 80 01	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gr. Mountain, Ca.	125	10	*	....	212	No 81 7½	.....	.....	.....	.....	.39	.....	.41	.40	.39	.....	.....	.....
Hale & Nor., Ne..	112	100	4003	Se 82 50	1598	Ap 71 5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hall-And's'n, N.S.	150	1	...	....	7	Ja 82 05	.....	.....	.....	.....	1.30	1.25	1.45	.....	1.55	1.50	.....	.....
Hecla Con., Mon.	300	50	...	....	387	No 82 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hibernia, Co.....	300	25	*	....	180	Jy 81 40	.....	.....	.....	.....	.....	.....	.....	.....	.01	.....	.02	.....
Homestake, Dk..	100	100	200	Ju 78 1 00	1762	De 82 40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Horn-Silver, Ut..	400	25	*	....	1700	No 82 75	6.63	6.38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hukill, Co.....	200	5	*	....	210	De 78 10	.15	.14	.....	.....	.....	.....	.....	.....	.15	.14	.15	.14
Indep., Ne.....	100	100	185	Fe 82 15	225	Se 79 25	.....	.....	.....	.....	.....	.....	.....	.....	.61	.....	.....	.....
In. Queen, Ne....	123	2	...	....	305	No 82 02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Inyo, Ca.....	100	5	*	....	45	Ap 82 05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Silver, Co..	500	20	*	....	900	De 82 20	.....	.....	.....	.....	2.40	2.35	2.40	.....	2.40	2.30	2.35	2.30
Jocuistita, Mex..	100	100	...	....	750	No 82 1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kentuck, Nev....	30	100	342	No 81 30	955	Fe 70 5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
La Plata, Co.....	200	10	*	....	610	Se 82 36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Leadville C., Co..	400	10	*	....	250	No 82 05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Leeds, Ut.....	50	100	87	Ju 82 50	78	Oc 78 15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Chief, Co..	200	50	*	....	700	Au 80 50	.40	.39	.....	.....	.....	.....	.39	.38	.40	.39	.38	.....
Little Pitts., Co..	200	100	*	....	1050	Mr 80 50	.65	.....	.....	.....	.65	.....	.....	.....	.65	.60	.....	.....
Martin White, Ne	100	100	950	Se 82 25	90	Jy 79 30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Min s Nu'v's, Mex	100	3	*	....	20	Jy 82 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moose, Co.....	200	10	4	....	550	Mr 78 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morning Star, Co.	100	10	...	....	565	De 82 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Navajo, Ne.....	100	100	235	Mr 82 20	100	De 82 25	8.25	.....	.....	.....	8⅛	.....	.....	.....	8.50	.....	8.50	8¾
N. Y. & Colo., Col.	50	20	...	....	20	Jy 79 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N'h'n Belle, Ne..	50	100	...	....	2300	No 82 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.75	.....
N. Belle Isle, Ne..	100	100	75	No 82 20	45	Se 82 15	.20	.....	.....	.....	.....	.....	.....	.....	.35	.....	.40	.20
Ontario, Ut.....	150	100	...	....	4925	Ja 82 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ophir, Ne.....	100	100	3495	De 82 1 00	1503	Ja 82 1 00	.....	.....	.....	.....	.....	.....	.....	.....	1.80	.....	.....	.....
Osceola, Mich....	50	25	480	Ap 76 1 60	735	De 82 1 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pleasant Val., Cal	100	100	...	....	30	De 82 05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plumas, Ca.....	100	10	*	....	151	Jy 79 5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quicks. Pref., Ca.	43	100	...	....	654	Ju 82 6 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Com., Ca.	57	100	...	....	151	Ju 82 40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quincy, Mich.....	40	25	200	De 62 5 00	3330	Au 82 5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rising Sun, Ca...	150	5	*	....	52	My 81 7½	.06	.....	.....	.....	.....	.....	.....	.....	.06	.....	.07	.....
Robinson Bar, Id.	100	1	*	....	9	De 82 03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Robinson C., Co..	200	50	*	....	575	No 81 50	1.25	1.20	.....	.....	1.25	.....	1.35	1.20	1.40	1.35	1.35	1.3
Robt. E. Lee, Co.	500	500	...	....	100	De 82 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Savage, Ne.....	112	100	5484	No 82 50	4460	Ju 69 3 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shoshone, Id.....	150	1	...	....	3	No 82 01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
SierraGrande, NM	...	...	...	....	300	Ja 83 25	3.70	3.20	.....	.....	3.65	3.00	3.30	3.10	3.15	2.85	3.25	2.55
Sierra Nev., Ne..	100	100	5150	De 82 1 0	102	Ja 71 1 00	3.70	2.25	.....	.....	.....	.....	3.50	.....	3.75	2.63	.....	.....
Silver King, Ar...	100	100	...	....	1125	De 82 25	.....	.....	.....	.....	10¾	.....	.....	.....	.....	.....	.....	.....
Silver King, Co...	500	2	...	....	50	Au 81 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Socorro, N. Mex..	2.5	100	...	....	4	Mr 82 ¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spring Valley, Ca..	100	1	*	....	50	Ja 81 25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard, Ca.....	100	100	...	....	4050	Ja 83 25	.....	.....	.....	.....	6¾	.....	.....	.....	.....	.....	.....	.....
Starr-Grove, Ne..	200	10	*	....	16	Ju 81 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stormont, Ut.....	200	1	*	....	155	No 81 05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Joseph, Mo....	100	10	*	....	390	De 82 20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tip Top, Ar.....	100	100	170	Mr 80 50	100	No 81 20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tombstone, Ar...	100	25	*	....	1250	Ap 82 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vizina, Ar.....	200	25	...	....	140	Mr 82 10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Jacket...	120	100	5338	Fe 82 1 00	2184	Au 71 2 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.00	.....
.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
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.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Non-assessable. † The Deadwood has previously paid $275,000 in eleven dividends, and the Terra $75,000. ‡ 4817·5.

SALES.—Amie Consolidated, 65,200; Belle Isle, 500; Bodie Consolidated, 250; Bulwer, 1350; California, 1550; Chrysolite, 6100; Climax, 300; Consolidated Virginia, 7900; Eureka Consolidated, 100; Father De Smet, 100; Gold Stripe, 4900; Grand Prize, 900; Great Eastern, 1000; Green Mountain, 500; Hall-Anderson, 8500; Hibernia, 4200; Horn-Silver, 300; Hukill, 1800; Independence, 500; Iron Silver, 2550; Little Chief, 2600; Little Pittsburg, 1100; Navajo, 1600; Northern Belle, 200; North Belle Isle, 3400; Ophir, 50; Rising Sun, 1600; Robinson Consolidated, 44,400; Sierra Grande, 50,470; Sierra Nevada, 765; Silver King, 100; Standard, 20; Yellow Jacket, 100. Dividend shares sold, 213,910.

cent, payable January 16th. Transfer-books close January 10th, and reopen January 17th.

The Standard Consolidated Mining Company, of California, has declared its fiftieth dividend of twenty-five cents per share, payable January 12th, at the Farmers' Loan and Trust Company. Transfer-books closed January 4th, and open January 13th.

The Ontario Silver Mining Company, of Utah, has declared its usual monthly dividend (No. 87) of $75,000, payable January 15th. Transfer-books close on the 10th.

UNLISTED QUOTATIONS.

Mr. Alexander C. Lassen, No. 61 Broadway, under date of January 5th, three P.M., reports the current quotations of unlisted stocks as follows:

	Bid.	Asked.		Bid.	Asked.
Bodie Tunnel	$0.25	$0.75	Hibernia Silver, (New)	$0.16	$0.21
Barcelona	.22	.24	Hond. Rosario	1.25	5.00
Buckeye Water	.50	....	Little Rapids	....	1.00
Bunker Hill	.99	1.00	London Cons	.90	1.35
Borva Copper	....	2.00	Mack Morris	....	.75
Batopilas Pref	9.00	24.00	Madre	.50	2.00
Berkshire	....	.35	Moulton	....	4.00
Calif'rnia Wat'r	.25	....	Santa Maria	.40	1.10
Centennial	....	.20	Stormont, new	.20	.30
Col. & Beaver	.05	.10	Satemont	.50	.75
Contention	3.00	8.00	Sierra Apache	.25	.30
Dahlgren	.40	....	Sierra Bella	.40	.50
Empire Gold	2.00	....	Terrible	1.75	....
Eureka Tunnel	.60	1.00			
Grand Central	1.50	....			

REVIEW OF THE SAN FRANCISCO MARKET.

The San Francisco market has been dull and featureless. There is no improvement in the Comstock shares. Telegraphic dispatches state that Senator Fair, when interviewed by the Stock Exchange Investigating Committee, concerning the mines, said he still had great hopes of developing more bonanzas in the lower levels. He was not surprised that stockholders were growing impatient; but stated that every thing possible was doing for their relief, and that the mines and managers' books were open to the committee for investigation. The efforts of the committee have resulted in the managers materially reducing the salaries of mining officials. The *Tribune* publishes the following dispatch:

SAN FRANCISCO, Dec. 29.—The *Post* announces, by authority, to-day, that at a recent meeting of presidents of the Comstock mining companies under control of the Bonanza firm, measures for the alleviation of the situation were discussed, and are likely to be speedily acted upon. A plan to reduce expenses at the mines without curtailing important exploratory work is under consideration. If it is carried out, assessments in future will be smaller and levied at less frequent intervals.

Senator Sharon has not as yet carried out his threat to take the mining stocks under his control from the list. The Tuscarora stocks remain the strongest on the market, and are held for advanced prices. The Alta Mining Company has levied an assessment of twenty-five cents per share.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. Dec. 29.	Dec. 30.	Jan. 1.	Jan. 2.	Jan. 3.	Jan. 4.
Alpha	27-32	27-32	....	....	27-32	1
Alta	¼	¼	....	¼	3-16	5-32
Bechtel	....	....	....	....	....	....
Belcher	11-16	11-16	....	....	....	....
Best & Belcher	3⅞	3⅞	....	4	3⅞	4
Bodie	1⅞	1⅞	....	2	1⅞	2
Bullion	13-16	13-16	....	27-32	1	15-16
Bulwer	....	....	....	....	....	....
California	3-16	3-16	....	3-16	¼	¼
Challar	1⅛	1⅛	....	1⅛	1⅛	1¼
Con. Virginia	13-32	13 32	....	⅛	13-32	⅛
Crown Point	29-32	29-32	....	....	¾	¾
Eureka Con	9	9	....	....	....	....
Exchequer	3-16	3-16	....	3-16	3-16	....
Gould & Curry	1¾	1¾	....	1⅞	1¾	1⅞
Grand Prize	11-32	11 32	....	....	....	5-16
Hale & Norcross	1⅛	1⅛	....	1⅛	1	1⅛
Manhattan	....	....	....	....	....	....
Martin White	3	3	....	3	3	3
Mexican	2¾	2¾	....	2¾	3	3
Mono	3-16	3-16	....	5-32	....	....
Mount Diablo	3⅞	3⅞	....	4	4	4
Navajo	....	....	....	7¾	8	8⅛
Northern Belle	9½	9½	....	9½	9½	9½
Noonday	....	....	....	....	....	....
Ophir	1¾	1¾	....	2	1¾	1⅞
Oro	....	....	....	....	....	....
Overman	3-32	3-32	....	3-32	....	5-32
Potosi	1⅛	1⅛	....	1⅛	1⅛	1⅛
Savage	13-16	13-16	....	¾	¾	27-32
Scorpion	½	½	....	....	9-16	19-32
Sierra Nev	2½	2½	....	2⅝	2⅝	2
Silver King	....	....	....	10	10	....
Tip Top	....	....	....	....	....	....
Union Con	3⅛	3⅛	....	3¼	3⅛	3⅛
Wales Con	3-16	3-16	....	3-16	3-16	3-16
Yellow Jacket	1⅛	1⅛	....	1⅛	1	....

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

BOSTON, Jan. 4.

The market the past week has been dull and inactive, as usual at the close of the year. We look for a better business in mining stocks the coming year, and shall be disappointed if, at its close, our expectations are not realized. The really good mines are sought for for investment purposes, and where good dividends are assured, it is as easy to sell them as it is railroad or other sound stock, and the record of some of our copper stocks shows that the dividends are fully as reliable. Calumet & Hecla continues to be in good demand, and maintains its position in the market, as A 1, and all the stock put on the market finds ready purchasers at $250@$252 per share. Franklin has advanced from $15@$15½, and is wanted at this price, but very little is offering. This mine will soon take its place among the dividend-paying mines, and sell at much higher figures. Pewabic is heavy, and declined to $10 on free sales. The reports from the mines are good. The mass of copper recently uncovered proved to be very pure, yielding from 95 to 97 per cent pure copper. Quincy declined from $64½ (December 28th) to $62¾, but latter rallied to $64, buyer 60, for 25 shares. Osceola sold at $33. Huron sold at $2. Allouez sold at $2½, assessment 50c. paid. National sold at $1½. Brunswick Antimony at $14.

In silver stocks, Bonanza steady but dull at $2¼. Catalpa declined from 80@75c. Sullivan sold at $1. Silver Islet, $5½. San Pedro advanced from 30@47½c. Napa Quicksilver declined from $3½@$3¾.

At the Boston Mining and Stock Exchange, there has been a fair amount of business transacted, but the market is lacking in activity. The Board occupied its new quar-

NON-DIVIDEND PAYING MINES.

NAME AND LOCATION OF COMPANY.		NUMBER OF SHARES.	Par.	ASSESSMENTS. Total levied to date.	Date and amount of last.		HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. Dec. 30. H.	L.	Jan. 1. H.	L.	Jan. 2. H.	L.	Jan. 3. H.	L.	Jan. 4. H.	L.	Jan. 5. H.	L.
Advance													30c				30c	
Albion, s. L	Nev.	150,000	100	397,500	Jun. 82	25												
Allouez	Mich																	
Alpha	Nev.			420,000	Mar. 82	50												
Alta	Nev.	100,800	100	1,366,890	Dec. 82	25												
Alta-Montana, G	Mon.	500 000	10	*			29c	27c			28c		29c	26c	28c		28c	25c
Am. Flag, s	Colo	125,000	10	300,000	Jun. 77	25												
Barcelona, G	Nev	200,000	25	*			24c	23c			28c	23c			27c	24c	25c	22c
Battle Creek																		
Bear Creek	Cal.	300,000	1															
Beauce																		
Bechtel Con., G	Cal.	100,000	100	175,000	Oct. 82	10												
Best & B'cher, G &	Nev.	100,800	100	1,345,790	No. 82	50												
Big Pittsburg, S. L	Colo	200,000	100	*			10c						10c		14c	10c	13c	
Black Jack, G	Cal.	100,000	2½															
Bonanza Chief	Mon	1,000,000	1	*														
Bondholder	Colo	200,000	2½															
Boston Con., G	Cal.	100,000	100	95,000	Oct. 82	25												
Boulder Con																		
Bradshaw, s	Ariz	225,000	10				39c				40c		40c				37c	c
Buckeye	Colo	400,000	5	*													1c	
" pref																		
Bull-Domingo, S L	Colo	200,000	50	*														
Bullion, G, S	Nev.	100,000	100	3,747,000	Oct. 82	50												
Bye and Bye	Ariz	100,000	10	*														
Calaveras, G	Cal.	500,000	1	*							3c				8c	7c		
Clav'r's W.&M.Co	Cal.																	
Cal., B. H., G	Dak.	100,000	100	480,000	Au. 82	15							1.20				1.05	1.00
Carbonate Hill, S L	Colo	200,000	10															
Catskill, S	Nev.	300,000	5										3¾c					
Central Ariz'na, S	Ariz	100,000	100				37c				39c						37c	
Chapparal	Cal.																	
Cherokee, G	Cal.	150,000	10				6c								6c			
Chollar					Sep. 82	50												
Clarence	Can.																	
Colorado Cent'l, S	Colo	300,000	10															
Col'mb'a Con., G, S	Nev.	100,000	50															
Cons. Imp'ri'l, G, S	Nev.	500,000	100	1,425,000	Jan. 82	10									2c		2c	
Con. Pacific, G	Cal.	60,000	100	141,000	Au 82	25												
Crescent, S L	Colo	300,000	10	*														
Crowell, G	N. C.	50 ,000	1															
Dahlonega, G	Ga.	250,000	1	*														
Dardanelles, G	Cal.	100,000	10															
Decatur							10c	9c			9c		9c		10c	9c	10c	9c
Dunderberg, S	Colo	150,000	10	*														
Durango, G	Dak.	500,000	1	*														
Eastern Oregon																		
Elko Cons													9c		9c		9c	
Empire, S	Ut'h	100,000	100															
Enterprise	Colo										60c		60c				60c	58c
Exchequer	Nev	100,000	100	630,000	Jan. 82	25												
Fannie Barrett													2.05	2.00				
Globe Copper	Ariz.																	
Gold Placer, G	Colo	200,000	25	*														
Goodshaw, G	Cal.	100,000	100	200,000	Oct. 82	10												
Granville, G	N. C.	800,000	1	*														
Harshaw, S	Ariz	100,000	100															
Head Center, S	Ariz	100,000	100	160,000	May 82	20												
Hortense, S	Colo	200,000	10				10c				11c		11c	10c	10c			
Index	Cal.																	
Julia, G S	Nev.	110,000	100	1,394,000	Jan. 82	20												
Kossuth, G S	Nev.	108,000	100	421,200	Aug. 77	15												
Lacrosse, G	Colo	100,000	10	*													15c	
Leviathan, S	Nev	100,000	100	380,000	Sep. 82	25												
Lucerne, S	Colo	500,000	10	*														
Mariposa Pref., G	Cal.	50,000	100	1,687,500	Dec. 81													
" Com., G	Cal.	100,000	100	1,950,000	Feb. 82													
May Belle, G	Cal.	100,000	100	84,000	Dec. 81	20												
Mayflower, S	Colo	100,000	100	*														
Mexican, G, S	Nev.	100,800	100	2,146,600	Oct. 82	$1	2.50								3.15			
Michoacan Synd	Mex.																	
Miner Boy, G & L	Colo	500,000	10	*														
Miller	Nev.	200,000	25															
Mono, G	Cal.	50,000	100	525,000	Oct. 82	25												
Moose Silver, S	Colo	300,000	10															
Nevada Syndi																		
North Standard, G	Cal.	100,000	100	20,000	Nov. 81	10												
N. Horn-Silv'r, S L	Utah	400,000																
Noonday	Cal.	60,000	10	208,000	Dec. 82	$1												
Old Dominion, C	Ariz	200,000	100	*														
Oriental	Nev.	200,000	10															
Ori'nt'l & Miller, S	Nev.	400,000	25				13c	12c			12c		12c		12c		13c	12c
Overman, G S	Nev.	115,200	25	3,604,740	May 82	25												
Potosi	Nev.	112,000	100	500,840	Nov 82	25												
Prussian																		
Quartz Creek			100				3c				3c		3c		3c		9c	
Rappahannock, G	Va.	250,000		*														
Red Elephant, S	Colo	500,000	1	*							5c		5c					
Rest			10															
San Pedro, G S L	N. M	400,000																
Silver Cliff, S	Colo	200,000	25	*			37c	35c			38c		38c	35c	35c		35c	
Silver Islet	Can.		50															
Sonora Con	Mex.																	
South Bodie, G	Cal.	100,000		100,000	Mar. 82	15												
South Butwer, G	Cal.	100,000	100	195,000	May 81	25												
South Hite	Cal.	100,000	100		May 82	10												
South Pacific	Cal.		5				10c	9c			9c		9c		10c	9c	9c	
State Line No. 1, S	Nev.	200,000	1															
" No. 2, S	Nev.	200,000	25															
" No. 3, S	Nev.	200,000	25															
" No. 4, S	Nev.	200,000	25															
" Nos. 1 & 4, S	Nev.		25										3c		3c		3c	
" Nos. 2 & 3, S	Nev.										7c		8c	7c	8c	7c	8c	6c
Sutro Tunnel	Nev.	2,000,000		*			17c				18c		25c	17c	20c	19c	22c	20c
Taylor-Plumas			10				23c	22c			22c	22c	21c	19c	21c	20c	19c	
Tioga, G	CC.	100,000		285,000	Oct. 82	10												
Tuscarora, S	Nev	100,000	100	110,000	Oct. 81	15												
Unadilla, S	Ariz	500,000	100	*							4c	3c	5c				8c	
Union Cons, G & S	Nev.	100,000	1	1,460,000	Oct. 82	$1	2.90											
Utah		20,000	100	1,360,000	Dec. 82	$1												
Vandewater	Nev.	200,000	100	*			32c	31c			31c		30c		32c		32c	
Washington	Ariz.	200,000	10				12c						12c					
Whalen Copper	Nev.	100,000	25															
Wide West																		
Willshire	Cal.	50,000	5	*														

SALES.—Advance, 200; Alta-Montana, 4t.00; Barcelona, 20,300; Big Pittsburg, 3000; Bradshaw, 2500; Buckeye, 100; Calaveras, 100; Calaveras, W. & M. Co., 400; Caledonia, B. H., 250; Catskill, 100; Central Arizona, 600; Cherokee, 900; Consolidated Imperial, 1300; Decatur, 11,300; Elko Consolidated, 4300; Enterprise, 3000; Fannie Barrett, 1900; Hortense, 1300; Lacrosse, 100; Mexican, 110; Oriental & Miller, 12,600; Quartz Creek, 6900; Rappahannock, 1000; Red Elephant, 1900; Silver Cliff, 6800; South Pacific, 19,300; State Line, Nos. 1 & 4, 2900; State Line, Nos. 2 & 3, 29,800; Sutro Tunnel, 15,400; Taylor-Plumas, 43,700; Tuscarora, 2100; Unadilla, 3 00; Union Consolidated, 300; Vandewater, 1900; Washington, 500. Non-dividend shares sold, 205,160. Total shares sold at all the Exchanges, 419,070.

BOSTON MINING STOCKS.

	Dec. 29.		Dec. 30.		Jan. 1.		Jan. 2.		Jan. 3.		Jan. 4.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez	2.12½	.....	.....	.....	.....	.....	2.50	2.12½	.....	.....	.....	.....	400
Atlantic	16.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20
Aztec	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Best & Bel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bodie Con	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.25	.....	50
Bonanza D	2.18¾	2.12½	2.25	2.12½	.....	.....	2.25	.....	.....	.....	.....	.....	1,400
Bruns. Ant	.....	.....	.....	.....	.....	.....	14.00	.....	.....	.....	14.00	.....	80
Bulwer	1.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
California	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cal. & Hec	250	.....	.....	.....	.....	.....	251	.....	252	.....	252	.....	19
Carbon. Hill	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Catalpa	.85	.80	.80	.....	.....	.....	.80	.....	.77½	.....	.77½	.75	4,270
Central Ariz	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cherryfield	.....	.....	.....	.....	.....	.....	.26	.....	.25	.....	.25	.....	1,000
Chrysolite	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. V'ginia	.52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.45	.....	600
Copp'r Falls	.....	.....	.....	.....	.....	.....	.....	.....	2.00	.....	.....	.....	100
Crescent	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumberl'd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Deer Isle	.17	.....	.15	.12½	.....	.....	.12½	.11	.10	.....	.13	.11	9,100
Denver City	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Duncan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunkin	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Empire	.27	.....	.27	.....	.....	.....	.30	.28	.20	.....	.30	.....	5,550
Eureka Con.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin	15.00	.....	.....	.....	.....	.....	15.00	.....	15.50	15.00	15.50	.....	292
Gila County	.23	.....	.....	.....	.....	.....	.23	.....	.23	.....	.24	.23	4,200
Hancock G	.....	.....	.....	.....	.....	.....	9.12½	.....	.....	.....	.....	.....	200
Harsnaw	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Horn-Silver	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Huron	2.00	.....	.....	.....	.....	.....	.....	.....	1.87½	.....	.....	.....	525
Independ'ce	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indian Q'n	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Pitts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Madison	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mammoth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mass. & N.M.	.18	.17	.17	.....	.....	.....	.19	.17	.19	.18	.20	.19	19,400
Milton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Napa	3.50	.....	3.37½	.....	.....	.....	3.45	.....	.....	.....	.....	.....	450
National	.....	.....	.....	.....	.....	.....	1.50	.....	1.50	.....	.....	.....	250
North. Belle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Osceola	.....	.....	.....	.....	.....	.....	33.00	.....	.....	.....	.....	.....	5
Penn-Breck	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pewable	11.00	.....	10.00	.....	.....	.....	.....	.....	10.25	10.00	.....	.....	595
Pine Tree	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.15	.....	500
Plymouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quincy	.....	.....	.....	.....	.....	.....	63.00	62.75	63.00	62.75	63.50	.....	246
Ridge	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Robinson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Pedro	.35	.....	.30	.....	.....	.....	.40	.35	.50	.....	.47½	.....	2,300
Silver Islet	.....	.....	.....	.....	.....	.....	5.50	.....	.....	.....	.....	.....	120
Silver King	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
So. Pacific	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard	7.25	.....	.....	.....	.....	.....	.....	.....	7.37½	.....	7.25	.....	44
State Line	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nos. 2 & 3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sullivan	1.00	.....	.....	.....	.....	.....	.....	.....	1.00	.....	.....	.....	250
Sutro Tun	.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500
Sycamore	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Twin Lead	.....	.....	.40	.38	.....	.....	.....	.....	.35	.....	.35	.....	1,700
Vizina	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

PHILADELPHIA MINING STOCKS.

	Dec. 29.		Dec. 30.		Jan. 1.		Jan. 2.		Jan. 3.		Jan. 4.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Argent	.12	.....	.13	.12	.....	.....	.13	.....	.14	.13	.13	.12	35,200
Arizona So	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aztec	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Battle Mt	.02	.....	.....	.....	.....	.....	.....	.....	.02	.....	.02	.....	15,000
Black Sul	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bodie	.....	.....	.....	.....	.....	.....	.04	.....	.....	.....	.04	.....	7,000
Buena	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Calista	.....	.....	.....	.....	.....	.....	.....	.....	.05	.....	.....	.....	2,000
Cincinnati	.13	.12	.13	.12	.....	.....	.11	.....	.12	.....	.....	.....	16,700
Comprom'e	.32½	.30	.30	.....	.....	.....	.32½	.30	.....	.....	.32½	.....	6,000
Dauntless	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,000
Del Monte	.....	.....	.....	.....	.....	.....	.10	.....	.11	.....	.11	.....	1,500
Denver City	.....	.....	.....	.....	.....	.....	.....	.....	.22	.21	.21	.....	8,150
Fairview	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Girard	.18	.17	.18	.17	.....	.....	.16	.14	.17	.....	.17	.....	14,400
Golconda	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Golden Age	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Governor	.....	.....	.05	.....	.....	.....	.....	.....	.....	.....	.05	.....	1,400
Grand Uni'n	.09	.....	.....	.....	.....	.....	.10	.....	.10	.....	.....	.....	10,200
Gunnison	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hancock	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Intervener	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iowa Gulch	.07	.....	.08	.....	.....	.....	.07	.....	.08	.....	.09	.....	13,750
King Bul'on	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Dia'd	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Maud	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.04	.....	1,100
L'g & D'y Hl	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
McCullough	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Magnolia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montana	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mt. Lincoln	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mt. Sheridan	.....	.....	.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,100
National	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orion	.....	.....	.10	.....	.....	.....	.....	.....	.....	.....	.09	.....	1,230
Palmetto E	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pembina	.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.15	.....	2,050
Penn-Breck	.10	.....	.10	.....	.....	.....	.....	.....	.13	.10	.13	.....	10,900
Permanent	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pizarro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pizarro Ex	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Potosi	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rara Avis	.40	.....	.....	.....	.....	.....	.40	.....	.42½	.40	.40	.....	3,600
Rara Avis E	.....	.....	.03	.....	.....	.....	.03	.....	.04	.....	.....	.....	7,500
Record	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rico Pion'r	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Pedro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sierra G'nde	4.00	3.75	3.50	3.10	.....	.....	3.37½	3.00	3.15	3.10	3.15	2.95	10,250
Silver Cord	1.20	.....	1.22½	1.12½	.....	.....	1.25	.....	1.30	1.25	1.30	.....	7,700
Silv'r Plume	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Rock	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sovereign	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sultana	.05	.....	.05	.05	.....	.....	.06	.....	.06	.....	.05	.....	26,200
Sutro Tun'l	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tombst'ne	.....	.....	.87½	.85	.....	.....	.87½	.....	.....	.....	.....	.....	1,800
Tranquilli'y	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tyrone	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Victor	.....	.....	.....	.....	.....	.....	.01	.....	.....	.....	.....	.....	4,600
Yale Mt	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

ters in the parlors of the Board of Trade, at the opening of the new year, and the change, it is hoped, will be beneficial to the members in the increased facilities enjoyed for doing business. Massachusetts & New Mexico is firm at 18@19c. Empire advanced to 30c. Deer Isle declined to 10c.

3 P.M.—There was no life to the market this afternoon. Calumet & Hecla sold at $252. Catalpa sold at 77½c. Quincy declined to $63½. San Pedro sold at 47½c. Allouez, $2½ bid, $2¾ asked. Atlantic, $17 asked. Antimony, $14 bid, $15 asked. Huron, $1¼ bid, $2 asked. Osceola, $32 bid, $33 asked. Pewabic, $10¼ bid. Silver Islet, $5 bid, $6 asked.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 5.

The Eastern manufacturers of pig-iron for the open market held so protracted a meeting at the rooms of the Iron and Metal Exchange to-day that we could not obtain a report before going to press.

American Pig.—We hear that in the earlier part of the week contracts for about 4000 tons of Foundry have been closed at our quotations. It is proper to say, however, that the figures could probably now be shaded, the market being weaker and in buyers' favor. We quote at tide-water, standard to choice brands, $24.50@$26.50 for No. 1 Foundry; $22.50@$23 for No. 2; and $20.50@$21 for Gray Forge. Foreign Bessemer pig is still held at $22.50 ex ship, with no takers, and spiegeleisen is unchanged on the basis of $34@$34.50 for 20 per cent.

Scotch Pig.—With the demand slackening further, continued low freights, further quantities of arrivals going into store and forced sales, Scotch pig is declining steadily. During the week, transactions foot up to about 750 tons, in some cases even below our reduced quotations, which are, for spot; Coltness, $25.75@$26.25; Summerlee, $24.50@$24.75; Glengarnock, $22.75@$23; and Eglinton, $21@$21.25. At the Wall Street Exchange, the cables to-day are as follows, showing only a slight change in Eglinton: Carnbroe, 56s.; Gartsherrie, 64s.; Summerlee, 63s.; Coltness, 67s. 6d., Langloan 67s; Glengarnock, 55s. 6d.; and Eglinton, 50s. 9d. Warrants are unchanged at 49s.

Steel Rails.—Very little has been done. Makers feel that the low prices have secured them nearly the whole field formerly occupied by iron rails, and that they have caused a cessation of the rolling of blooms abroad for our market. They do not look for any marked changes in the near future. We quote $40 at mill.

Old Rails.—We have not heard of a single sale, and quotations remain nominally $25@$25.50 for Ts.

Scrap.—Nothing has been done. Nominally, we quote $26@$26.50 ex ship for No. 1.

Philadelphia. Jan. 5.

A more confident expression of opinion has been heard within the last two or three days among iron manufacturers and brokers than for several weeks. In some cases, the expression may be dictated by a desire for better business, but an impartial review of the situation seems to justify the expectation of an improving trade, and in some cases of improving prices. No general upward tendency has exhibited itself, and none is likely for a while; but the unfavorable tendency in prices has certainly disappeared, and if nothing better can be expected, the market will be at least steadier. A greater confidence prevails, and every body is satisfied with the present situation and the immediate future of trade. Business is not as large as is desired, but the inquiries coming to hand point to an early revival of trade, such as has been predicted for weeks past.

Pig-Iron.—In pig-iron, there has been a great deal steadier demand, which absorbs the production, especially of standard brands, as fast as produced. In a few cases, some better quotations have been named to outside buyers; but to the general trade the same quotations continue, namely, $25@$26 for No. 1. No. 2 is unchanged. Gray Forge is quoted at $19@$21 at furnace. Large buyers have been in the market within forty-eight hours, and have bought freely from parties who were anxious to sell. Concessions have been extended in a few cases, but the disposition to sell in that way is not as strong as before the holidays.

Forge Iron of good brands is easily sold at $20.50@$21 at furnace; a number of small lots sold at $19. As soon as the weaker parties have unloaded all they have, a better feeling will prevail, and asking prices will be obtained. This is the sanguine view of the situation. The other side has been represented by careful brokers to be about this: that, in view of the reduction of tariff duties and the uncertainties as to the winter and spring supply of pig, coupled with the possibility of importations, crude iron will have a declining tendency, and nothing better than current rates may be expected. Bessemer pig has been under negotiation, and some business is done. Quotations, $22.50@$23.

Manufactured Iron.—Storekeepers report a fair demand in small lots at card rates. Large buyers are ready to place contracts if lower than quoted figures are accepted. There is a good deal of business of this character in hand, which will be placed, if terms are agreed upon, before Saturday. Buyers, if their terms are accepted, will place orders, while manufacturers feel that it is not wise to load up at present inside figures, since the least amount of business is accepted at some of the low rates prevailing.

Muck Bars are quiet, and selling between $39 and $40. A few blooms sold to-day at $66. Prices are weak. Skelp iron is weak and fluctuating.

Nails are quoted all the way from $3.50@$3.60. Some large inquiries have been received within a day or two, but the offers are very low. Jobbers are willing to buy car-load lots, if their terms are accepted, as they believe that the probabilities are, under a restricted policy, that makers will be able to command better terms. A season of activity is anticipated in the spring, and they are preparing to secure stocks for a sharp demand. Structural iron is under good inquiry, and specifications have arrived for late winter delivery; but nothing definite has been closed. Angles are quiet at 2·6@2·7c.; Tees, 2½c.; Beams, 4c.; Channels, 4·2c. Tank is quoted all the way from 2½@2¾c.; Sheet and Flange at like concessions; Bridge and Boiler-Plate iron have been inquired for, and current rates have been accepted for small lots for February delivery.

Steel Rails are moving mostly in small lots. Inquiries for a few large lots have been under consideration for two or three weeks, and, when some details as to delivery can be arranged, orders will be definitely placed. Old rails are weak, and fluctuating downward. Scrap is selling at $28 for best; $26@$27 for Medium; $22.50 for Crop Ends; $19.50 for Cast.

METALS.

NEW YORK, Friday Evening, Jan. 5.

Copper.—There is nothing new to report. The copper mills have not finished their repair work,

usually done during the first weeks of the year, and are not even buying small lots to cover an occasional deficiency. Lake is nominally held at 18c., while Western is selling in a small way at 17¼c. London cables at the close £72@£72 5s. for Best Selected, and £65 10s.@£65 15s. for Chili Bars.

Preliminary estimates of a large number of Lake Superior mines, including the Calumet & Hecla, Osceola, Quincy, Conglomerate, Central, Atlantic, Allouez, Ridge, Franklin, Pewabic, Huron, and National, aggregating 54,600,000 pounds refined copper, entitle us to believe that the product for the year 1882 will range between 58 and 59 millions. Elaborate returns from the West and East indicate an additional product of at least 30 millions, so that the total output of the country will foot up to at least 88 and possibly 90 millions, of which, however, about five millions did not reach the market.

Tin.—Tin has been increasing in firmness, the bulk of the spot stock being held by strong parties. Sales during the week aggregate about 100 tons. Yesterday, cash sales of from 30 to 40 tons were made on the basis of 21⅛c.; and to day a transaction was made, 30 days, at 21¼c. We quote at the close, 21¼@21¾c. England, which was down to £92 yesterday, reached to-day £94, spot Straits.

Lead.—The market is in a peculiar condition, but decidedly firmer. In a jobbing way, 4·75@4·80c. is asked and obtained readily for Common. In large lines, 4 65c. is freely offered, but 4.75c. is firmly held. We hear of no transactions.

Messrs. John Wahl & Co., of St. Louis, wire us to-day as follows:

Our market is unchanged. Soft Missouri is quoted 4·30c., and Hard Lead 4·25c.

Spelter.—This metal continues to drag along. We hear occasional rumors of low figures, but can not learn that the basis of actual transactions is lower than 4½@4⅝c. for Domestic, which we quote.

Antimony.—Antimony is quiet and dull at 10½c. for Hallett's, and 11½c. for Cookson's.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 5.

Anthracite.

The anthracite coal trade continues quiet under the influence of unseasonable weather, which, however, now promises to turn for the better. Prices remain fairly steady, only occasional lots, which can not be looked upon as representing the market, going off at lower figures. There seems to be a growing conviction that matters will be so shaped that the prices will be maintained as they stand now, and the scarcity of some sizes, together with the fact that tide-water stocks are low, encourages this view. It is urged with some persistence, and we believe with much justice, that production should be restricted. On the other hand, it can not be denied that the dry weather in the coal regions is naturally producing that effect. We hold, however, that this is not sufficient, and are of the opinion that a short stoppage, at least, should be decided upon, if it were only to convince buyers that there is no prospect of the "break" which they are apparently waiting for.

The production of anthracite for the week ended December 30th was 453,882 tons, as compared with 6 8,370 tons the previous week, and 594,845 tons for the corresponding week of 1881. The total product from January 1st to December 30th was 29,316,387 tons, as against 27,991,164 tons for the like period of a st year, showing an increase this year of 1,325,223 tons.

A gentleman prominently connected with the coal trade of Philadelphia sends us the following, under date of the 4th:

The local trade has held on remarkably well for this season, but shows signs of weakness on account of the continuance of mild weather. Restriction for one or two weeks this month is now agitated, and will no doubt be shortly determined upon.

Shipments are very light. The freight to Boston remains at $2, and orders at that rate must remain scarce while charters are made at $1.25 in New York.

Until the winter sets in in earnest, if we are to have any winter, the trade here will be very quiet.

Bituminous.

The bituminous coal trade is quiet, but it must be noted that there are inquiries from parties who do not usually enter the market at this time of the year. This is particularly the case with certain Eastern railroads, which, it is stated, are buying Cumberland coal because the parties who contracted for their supply are not able to fill them as fast as desirable. The Clearfield operators are doing a little better so far as the supply of cars is concerned, and are taking less Cumberland coal than for some time past. Freights are generally easier, and prices here are a little weaker. We quote Cumberland, according to quality, $4.65@$4.85.

BULLION MARKET.

NEW YORK, Friday Evening, Jan. 5.

Under an active and enlarged demand for Eastern Exchange, the India Council has sold, at improved rates, a large amount of its bills within the past fortnight. This has checked the decline in silver, and it is inquired for at an advance of a cent an ounce. From present appearances, another advance seems probable.

DATE.	London Pence.	N. Y. Cents.	DATE.	London Pence.	N. Y. Cents.
Dec. 30....	50	108⅜	Jan. 3.....	50¼	108⅝
Jan. 1....	50⅛	Hl'day.	Jan. 4.....	50⅜	109⅛
Jan. 2. ..	50 3-16	108⅝	Jan. 5.....	50 7-16	109¼

BULLION PRODUCTION FOR 1882.

We give below a statement showing the latest bullion shipments. These are officially obtained from the companies, where that is possible; and where official statements can not be procured, we take the latest shipments published in those papers nearest to the mines reported. The table gives the amount shipped for the week up to the date given, as well as the aggregate shipments to such date from the first of January, 1882.

The shipments of silver bullion are valued at $1.29·29 per ounce troy; gold at the standard $20.67 per ounce troy. The actual value of the silver in the following table is therefore subject to a discount, depending on the market price of silver. If the price of silver be counted at $1.12 an ounce, which has for some months been about its average value, the following figures, where they relate to silver bullion, should be diminished by about 13¾ per cent to arrive at actual value.

MINES.	States.	For the week.	Month of December.	Year from Jan. 1st, 1882.
*Alice, G. S....	Mont..	.....	.....	$789,591
*Alta-Montana, S. L....	"	.....	.....	343,290
Barbee & Walker, S...	Utah..	.....	.....	84,262
*Belmont.....	Mont..	.....	.....	26,916
Betty O'Neal, S.....	Nev....	.....	.....	59 159
*Black Bear, G.....	Cal....	.....	.....	69,015
Bodie, G. S.....	"	.....	$21,444	414,425
*Boston & Montana, G.	Mont...	.....	.....	265,615
*Caledonia, G.....	Dak....	.....	.....	76,655
*Caribou, S	Colo....	.....	.....	126,918
*Central Arizona, S...	Ariz....	.....	.....	180,858
*Christy, S.....	Utah...	.....	.....	334,114
*Chrysolite, S. L.	Colo....	.....	.....	289,578
Cons. Bobtail, G.	"	.....	.....	99,784
*Contention, S.....	Ariz....	.....	.....	1,692 604
Crismon-Mammoth, G.	Utah....	.....	.....	63,579
*Custer, G. S...	Idaho....	.....	.....	682 341
*Deadwood-Terra, G..	Dak....	.....	.....	551,052
*Dorbec Blue Grav., G.	Cal	.....	.....	133,781
*Eureka Con., G. S. L..	Nev....	.....	.....	903,538
Evening Star, S. L....	Colo....	.....	.....	862,520
*Father de Smet, G...	Dak....	.....	$21,288	391,269
*Frisco M. & S.Co., S. L	Utah...	.....	.....	348,574
Girard, S.....	Ariz....	.....	.....	90,964
Grand Central, S.....	"	.....	.....	1,136,719
*Hall Anderson, G....	N. S....	.....	.....	13,050
*Head Center, S.....	Ariz....	.....	.....	145,636
*Hecla, G. S. L.....	Mont..	.....	.....	77,945
*Homestake, G.....	Dak....	.....	.....	1,114,568
Horn-Silver, S. L.....	Utah...	92,500	294,500	3,539,516
*Hope, S.....	Mont...	.....	.....	304,067
Idaho, G.....	Cal	.....	.....	395,540
*Independence, S.....	Nev....	.....	.....	152,527
*Indian Queen, S	"	.....	.....	183,650
*Inyo Cons., G.....	Cal	.....	.....	59,421
Ingersoll, S.....	Ariz....	.....	.....	90,000
Iron Silver, S	Colo....	.....	.....	865,436
*Jocalitita, S.....	Mex....	.....	.....	700,585
*Kentuck.....	Nev....	.....	.....	8,526
*†Leeds, S.....	Utah..	.....	.....	11,988
Lexington, S.....	Mont...	.....	.....	88,508
*Little Pittsburg, S. L.	Colo..	.....	.....	134,538
Manhattan, S.....	Nev....	.....	.....	64,300
Morning Star, S. L....	Colo....	.....	.....	478,636
Mount Diablo, S.....	Nev....	.....	.....	294,397
*Navajo, G. S.....	"	.....	.....	384,193
New York Hill, G.....	Cal	.....	.....	105,136
Noonday, G.....	"	.....	.....	67,818
North Noonday, G	"	.....	.....	83,456
Northern Belle, S.....	Nev....	.....	.....	749,012
*‡Ontario, S. L.....	Utah..	.....	.....	2,221,303
Ophir, G. S.....	Nev....	.....	.....	39,472
*Oxford, G.....	N. S....	.....	.....	15,564
Pascoe, S.....	Utah..	.....	.....	4,575
*Pleasant Valley, G. S.	Cal	.....	.....	46,360
Robert E. Lee, S.....	Colo....	.....	.....	292,550
*Satemo, G.....	N. S....	.....	.....	11,695
Savage, S.....	Nev....	.....	.....	33,281
*Silver Bow, G. S....	Mont...	.....	.....	330,182
Silver King, S	Ariz....	.....	.....	711,405
*Spring Valley, G....	Cal	.....	.....	152 000
Standard, G.....	"	.....	60,700	1,101,874
Star, S.....	Nev....	.....	4,515	61,716
Stormont, S.....	Utah..	6,430	19,690	283,994
*Sullivan, S.....	Maine..	.....	.....	4,536
Syndicate, G.....	Cal ..	.....	.....	38,509
Tintic M. & M. Co....	Utah...	3,170	10,576	58.449
*Tip Top, S.....	Ariz....	.....	.....	209,428
*Tombstone, G. S.....	"	.....	.....	889,896
*Union Con., S.....	Nev....	.....	.....	318,291
Vizina, S.	Ariz....	.....	.....	165.300
Total amount of shipments to date.....				$26,999,170

* Official. † Net. ‡ Assay value. *G Gold. S. Silver L. Lead.*

Bullion Receipts at New York.—The bullion received from the mines at the various offices in this city during the week ended January 5th, as compiled from various sources, amounted to $496,579.80, as against $472,178.99 reported for the previous week. The receipts from January 1st, 1883, to date, are $496,579.80.

Foreign Bank Statement.—The governors of the Bank of England, at their weekly meeting, made no change in the bank's minimum rate for discount, and it remains at 5 per cent. During the week, the bank lost only £45,000 bullion; but the proportion of reserve to its liabilities was reduced from 36 1-16 to 29⅞ per cent, against 31⅝ per cent at this date in 1882. January 4th, the bank gained £6 00 bullion on balance. The weekly statement of the Bank of France shows an increase of 9,575,000 francs gold and 8,500,000 francs silver.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended December 30th, and year from January 1st:

TONS OF 2240 LBS.	1882. Week.	1882. Year.	1881. Week.	1881. Year.
Wyoming Region.				
D. & H. Canal Co..	.....	3,581,973	81,443	3,581,781
D. L. & W. RR. Co.	77,104	4,595,518	97,818	4,271,953
Penna. Coal Co.....	28,007	1,438,821	27,621	1,406,659
L. V. RR. Co.....	12,333	1,095,266	27,371	1,155,492
P. & N. Y. RR. Co..	2,979	194,680	3 501	105,454
C. RR. of N. J.....	52,023	2,204,234	47,088	2,282,160
Penna. Canal Co....	.....	529,026	.....	457,260
	172,446	13,729,518	284,842	13,260,159
Lehigh Region.				
L. V. RR. Co.....	84,334	4,913,818	105,666	4,519,907
C. RR. of N. J.....	55,465	2,270,168	46,751	2,175,906
S. H. & W. B. RR..	.....	51,756	.....	10,926
	139,799	7,235,742	151,817	6,706,739
Schuylkill Region.				
P. & R. RR. Co.....	117,744	7,047,360	156,878	6,945,243
Shamokin & Lykens Val.....	22,618	1,238,842	.....	1,014,823
	140,362	8,286,202	156,878	7,960,066
Sullivan Region.				
St Line&Sul.RR.Co.	1,275	64,925	1,308	64,200
Total	453,882	29,316,387	594,845	27,991,164
Increase.....	.....	1,325,223	.....	.....
Decrease.....	.....	.....	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Total same time in 1877.....20,134,739 tons.
" " " " 1878.....17,127,681 "
" " " " 1879.....25,769,385 "
" " " " 1880.....23,096,111 "

The decrease in shipments of Cumberland Coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 896,452 tons, as compared with the corresponding period in 1881.

Belvidere-Delaware Railroad Report for the week ended December 30th:

	Week.	Year. 1882.	Year. 1881.
Coal for shipment at Coal Port (Trenton)	2,843	101,786	84,399
Coal for shipment at South Amboy.....	10,822	832,743	777,970
Coal for distribution.....	18,023	778.407	732,083
Coal for company's use	3,030	133,473	115,851
Total.....	34,718	1,846,409	1,710,283
Increase...	.....	136,126	.....
Decrease....	.....	.....	.....

The Production of Bituminous Coal for the week ended December 23d was as follows:

Tons of 2000 lbs., unless otherwise designated.

	Week. Tons.	Year. Tons
Cumberland Region, Md.		
Tons of 2240 lbs.....	...41,999	1,471,151
Barclay Region, Pa.		
Barclay RR., tons of 2240 lbs.	7,663	397,314
Broad Top Region, Pa.		
Huntingdon & Broad Top RR....	5,551	266,274
East Broad Top.....	2,383	91,061
Clearfield Region, Pa.		
Snow Shoe.....	4,363	229,276
Tyrone and Clearfield..... . . .	..52,756	2,743,313
Alleghany Region, Pa.		
Pennsylvania RR..	6,659	514,918
Pittsburg Region, Pa.		
West Penn RR.....	12.743	361,788
Southwest Penn. RR.....	3,043	108,287
Penn & Westmoreland gas-coal, Pa. RR	26.308	1,248,465
Pennsylvania RR.....	14,581	634,135
Total.... 178,049		8,065,982

The Transportation of Coke over the Pennsylvania Railroad for the week ended December 23d and year from January 1st:

Tons of 2000 lbs.	Week.	Year.
Penn. RR. (Alleghany Region).....	2,175	108,739
West Penn. RR	2,527	116,361
Southwest Penn. RR	39,292	1,759,916
Penn. & Westmoreland Region, Pa. RR	6,080	272,263
Pittsburg, Penn. RR.....	16,103	548,149
Snow Shoe (Clearfield Region)..... .	256	20,747
Total	66,433	2,826,175

Horsford's Acid Phosphate.

Mental and Bodily Exhaustion, etc.

DR. G. KAISER, Indianapolis, Ind., says: "I have prescribed it for dyspepsia, impotency, and mental and bodily exhaustion; and in all cases it has given general satisfaction."

ONTARIO SILVER MINING COMPANY,
No. 18 Wall Street,
NEW YORK, Jan. 5, 1883.

DIVIDEND NO. 87.

The regular monthly dividend of FIFTY CENTS per share has been declared for December, payable at the office of the Transfer-Agents, Lounsbery & Haggin, 18 Wall Street, on the 15th inst. Transfer-books close on the 10th inst.

LOUNSBERY & HAGGIN,
Transfer-Agents.